Metals Review

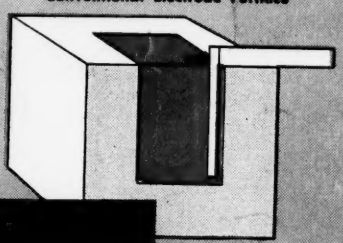
THE NEWS DIGEST MAGAZINE

Published by the American Society for Metals

Volume XXI, No. 8 | METAL SHOW ISSUE | September 1948

CONVERT and SAVE 35 to 55% this year!

Conventional Electrode Furnace



OLD to new

Here's what you save in direct heat treating costs by changing over to the new type replaceable assembly with Holden molten alloy electrodes:

1. *35 to 55% lower costs for operation and maintenance.*
2. *Sludge problems eliminated by automatic rectification.*
3. *10 to 25% less salt vaporization and consumption.*

Your old furnace becomes a modern, streamlined, flat-top model of high operating efficiency, with no exposed electrodes and low heat radiation losses.

Here's the information required for quotation on conversion of your present electrode furnaces:

1. *Pot size and Shell size of present furnaces.*
2. *Operating temperatures and production requirements.*
3. *Present transformer characteristics including power rating and primary and secondary voltages.*

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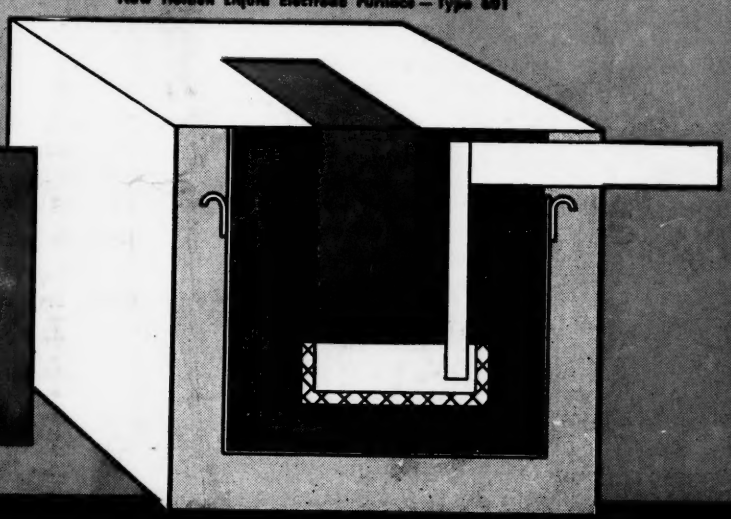
New Holden Liquid Electrode Furnace — Type 601



Write for Bulletin MR601

THE A. F. HOLDEN COMPANY • *Metallurgical Engineers*

Manufacturers Heat Treating Baths and Furnaces • NEW HAVEN 8, CONN.

FOREIGN MANUFACTURERS • Canada: Peacock Brothers Ltd., Montreal • France: Fours Electriques Ripache, Paris • Belgium: Le Four Industriel Belge, Antwerp, and other principal countries

STORY OF AMERICAN ACHIEVEMENT

As a fitting climax to 75 years of progress in Alloy Steel, the American Society for Metals dedicates its 30th National Metal Congress & Exposition to "A Salute to Alloy Steel". A vast panorama of Alloy Steel production and fabrication will be presented at the Exposition. Over 100 stimulating and helpful technical papers on Alloy Steel will be delivered at the Congress.

DISTINGUISHED SERVICE AWARDS

An outstanding feature of this diamond jubilee of Alloy Steel will be the presentation of "Distinguished Service Awards" to individuals who, by research, improved manufacturing processes, experimentation, new applications and various other means, have contributed to the improvement, development and acceptance of Alloy Steel.

THE DRAMA OF ALLOY STEEL

Along with the distinguished displays of over 350 manufacturers and processors of metals and metal products will be a spectacular visualization of the 75 years progress in Alloy Steel. Occupying the entire stage of Convention Hall, this exhibit will give visitors to the Exposition the complete story of Alloy Steel. Be sure to attend!

The ENTIRE METAL INDUSTRY
attends this Great Annual Event

Plan now to be in Philadelphia for the Metal Show! You'll see over 350 exhibits of new products, processing equipment and materials—actually in operation. You'll hear talks by the country's leading authorities on all phases of metal production, treatment and fabrication.

And this year, you'll be part of a gigantic "Salute to Alloy Steel", the metal industry's tribute to a great American development.

Philadelphia is a perfect setting for the 1948 Metal Show, convenient to the rich industrial East, with ample convention facilities. At least 35,000 visitors are expected—so make your plans today.

Hotel Reservations: A Housing Bureau has been set up to help you obtain reservations in leading hotels. List your requirements and send to: Charles L. Todd, Manager, Housing Bureau, Architects Bldg., 17th and Sansom Streets, Philadelphia 3, Pennsylvania.

Sponsored by American Society for Metals in cooperation with the American Welding Society, the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, and the Society for Non-Destructive Testing.

A Few Choice Exhibit Spaces still Available!

Write or Wire Collect: W. H. Eisenman, Managing Director, National Metal Exposition, 7301 Euclid Avenue, Cleveland 3, Ohio.
Phone: UTah 1-0200

Metals Review

THE NEWS DIGEST MAGAZINE

RAY T. BAYLESS, Publishing Director — MARJORIE R. HYSLOP, Editor — GEORGE H. LOUGHNER, Production Manager

VOLUME XXI, No. 9 — **SEPTEMBER, 1948**

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Join the SALUTE *to* ALLOY STEEL

SEVENTY-FIVE years ago a bridge was built over the Mississippi River at St. Louis. There was nothing revolutionary or spectacular about the design of this bridge to the layman's eye, but the scarcely noticeable change that marked the beginning of a new era in engineering structural steels was the fact that the compression members in the main arches were made of chromium alloy steel rather than timber, stone or wrought iron. A backward look over the 75 intervening years will reveal significant improvements in all branches of industry directly traceable to the use of alloy steels—in railroads, machine tools, the petroleum industry, farm equipment, electrical industry, automobiles and aircraft.

The 30th National Metal Congress therefore takes the opportunity to salute the 75th anniversary of the alloy steel industry. By display, by picture, by story, by honors and awards, the theme will carry through the week of the Congress activities.

The officers and trustees of the American Society for Metals extend a cordial invitation to all members of the cooperating societies, to engineers, plant executives, scientists and technologists, to come to Philadelphia the week of Oct. 25. There you can take your choice among 66 technical sessions of four cooperating societies: there you can see and examine 310 exhibits of the latest types of metalworking equipment, supplies and services; there you will find opportunities to exchange ideas and experiences with men in your own specialized line.

Past experience shows that there is profit for all. Scan the programs in the followings pages and plan now how you can best spend your days in Philadelphia.

Francis B. Foley

PRESIDENT, AMERICAN SOCIETY FOR METALS

National Metal Congress and Exposition

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A preview of the technical programs, lectures, dinners, special events and exhibits in store for metal men the week of Oct. 25 in Philadelphia

THE CELEBRATION of 75 years of progress in the alloy steel industry will be a constantly recurring theme during the 30th National Metal Congress and Exposition in Philadelphia, Oct. 25 through 29. While many special events, displays and ceremonies have been specifically planned to commemorate this diamond jubilee, the tremendous role that alloy steel has played in essential industries will be symbolized again and again in the technical papers and educational lectures of the four cooperating societies, and in the exhibits of modern materials and metalworking equipment at the National Metal Exposition.

Cooperative sponsors of the Congress and Exposition are the American Society for Metals, the American Welding Society, the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, and the Society for Non-Destructive Testing. Each of these societies will have a full program of technical papers, educational courses, special lectures and meetings, and social events.

Headquarters for the A.S.M. and the Society for Non-Destructive Testing will be at the Benjamin Franklin Hotel, for the American Welding Society at the Bellevue-Stratford, and for the A.I.M.E. at the Adelphia Hotel. The complete programs of these societies are listed on following pages.

The Exposition itself will be conveniently and amply housed in Philadelphia's handsome Convention Hall. The 350 exhibits will overflow from the main arena to the exhibit hall, and thence into Commercial Museum, an adjoining, high-ceilinged structure ideal for some of the more massive pieces of machinery and equipment that will be on display. A brief indication of the wide variety of equipment and products to be seen in Philadelphia is given in the list of exhibitors starting on page 31.

The Exposition will be open from noon until 10:00 p.m. on Monday, Tuesday and Wednesday, Oct. 25, 26 and 27, and from 10:00 a.m. to 6:00 p.m. on Thursday and Friday, the 28th and 29th. Admission will be by membership card of the cooperating societies, by special invitation distributed by the exhibitors, or upon payment of a $1.00 registration fee.

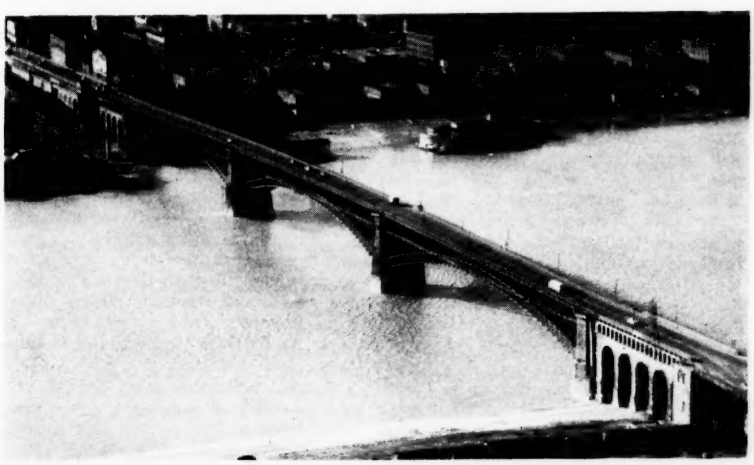
Registration desks will be provided at the various headquarters hotels, as well as at Convention Hall. However, to relieve some of the congestion that is bound to occur during peak attendance hours, an advance registration form is provided on page 63 of this issue of *Metals Review*. This form should be filled out and mailed to Convention Hall prior to Oct. 15. An entrance badge will then be returned by mail that will gain admission during the entire week of the Exposition.

The technical sessions of the various societies are open to anyone attending the Congress. They will convene in meeting rooms at the various headquarters hotels, with the exception of the A.S.M. afternoon and evening sessions, and the morning sessions on Thursday and Friday. These will all be held at Convention Hall to facilitate attendance at the Exposition.

Salute to Alloy Steel—Theme of the Show

The 75th anniversary of the first use of alloy steel in an engineering structure in America will be fittingly commemorated during the National Metal Congress and Exposition by a series of events and ceremonies. These will take the form of a spectacular display on the mammoth stage at Convention Hall visualizing 75 years of progress in alloy steel, the preparation and publication of an authoritative illustrated history of alloy steels, and the presentation of Distinguished Service Awards to individuals who have made notable contributions to alloy steel development.

The Historic Eads Bridge at St. Louis, Where Alloy Steel Was First Used in an Engineering Structure 75 Years Ago



The history of alloy steels will tell the romantic story of how Capt. James B. Eads in the 1870's pioneered in the design of a bridge over the Mississippi River at St. Louis with main compression members made of chromium steel. It will describe the almost insurmountable difficulties encountered in rolling and fabricating these hard steels at the plant of Wm. Butcher Steel Works (appropriately a Philadelphia firm and predecessor of the Midvale Co., whose present superintendent of research is president of the American Society for Metals). From there it will trace the rapid development of the various types of engineering alloy steels, now indispensable to modern civilization.

This history of alloy steels is being written by Carl A. Zapffe, well-known Baltimore consulting engineer, who has collected a large body of historical information from the leading steel producers and other old-timers in the industry. It will be

Honorary Committee

Chairman: Francis B. Foley, president, American Society for Metals.

William R. Boyd, Jr., president, American Petroleum Institute.

Oliver P. Echols, president, Aircraft Industries Association of America, Inc.

B. F. Fairless, president, U. S. Steel Corp.

William T. Faricy, president, Association of American Railroads.

A. B. Homer, president, Bethlehem Steel Co.

William C. Johnson, president, National Electrical Manufacturers Association.

George W. Mason, president, Automobile Manufacturers Association.

J. H. Oppenheim, president, Farm Equipment Institute.

A. G. Bryant, president, National Machine Tool Builders Association.

Walter S. Tower, president, American tional Electrical Manufacturers As-

C. M. White, president, Republic Steel Corp.

Harold K. Work, vice-president, American Society for Metals.

printed in the form of an attractively illustrated brochure and will be distributed free of charge during the Metal Congress.

Other arrangements for the various events comprising the Salute to Alloy Steel are under the competent supervision of the committees listed on this page. The honorary committee includes the presidents of eight national associations in the alloy steel consuming field and the presidents of the three largest steel producing companies, as well as the president and vice-president of the American Society for Metals, Francis B. Foley, superintendent of research, Midvale Co., and Harold K. Work, manager of research and development for Jones and Laughlin Steel Corp.

Exhibit Visualizes Progress

Under the chairmanship of Robert A. Wheeler, manager of publicity for International Nickel Co., the Committee to Visualize 75 Years of Alloy Steel Progress will prepare the exhibit at the National Metal Exposition. The display will occupy the entire stage, dominating the arena at Convention Hall.

The central motif will be a working replica of an early crucible furnace with an operator demonstrating the pouring of an ingot. Modern practice will be depicted by a large partition in the rear carrying illustrations of modern steelmaking furnaces.

Radiating from this central focus will be industry exhibits depicting the contributions of alloy steels to the development of essential industries. These will include the aircraft industry, automotive industry, electrical industry, farm equipment, petroleum, railroads, and the steel industry. Space will also be allocated to demonstrate the contributions of alloy steels to national defense. Both the Army and the Navy will be represented, in a joint display under the supervision of Commander James G. Reardon, U.S.N., and Major E. Criscti, U. S. A.

At intervals each day a brief story of alloy steel development in each industry will be told by sound-slide films. The expansion in use of engineering alloy steels, the reasons for their use and concurrent technological progress in the industry will be illustrated and described, and the probable direction of future developments will be shown by drawings.

Committee To Visualize Alloy Steel Progress

Chairman: Robert A. Wheeler, manager of publicity, International Nickel Co.

Aircraft Industry: J. B. Johnson, chief of materials lab, Wright Field

Automobile Industry: A. L. Boegehold, head of metallurgical dept., General Motors Research Lab.

Electrical Industry: W. E. Ruder, research metallurgist, General Electric Co.

Farm Equipment: Harry B. Knowlton, supervisor of materials engineering, International Harvester Co.

Petroleum Industry: Robert W. Schlumpf, chief metallurgist, Hughes Tool Co.

Railroads: Ray McBrian, engineer, research & standards, Denver & Rio Grande Western R.R.

Steel Industry: M. A. Grossmann, director of research, Carnegie-Illinois Steel Corp.

C. H. Herty, Jr., assistant to vice-president, Bethlehem Steel Co.

E. C. Smith, chief metallurgist, Republic Steel Corp.

Display Consultants: R. B. Hanna, display dept., General Electric Co.

H. H. Harris, president, General Alloys Co.

D. C. Miner, advertising manager, E. F. Houghton & Co.

C. M. Parker, secretary, committee on manufacturing problems, American Iron & Steel Institute

Suggestions Wanted for Candidates To Receive Distinguished Service Awards

A third event in the Salute to Alloy Steel celebration at the National Metal Congress will be the presentation of Distinguished Service Awards for meritorious contributions to alloy steel progress. These certificates and citations will be presented to living Americans and Canadians in all branches of the great field of engineering alloy steels. (The stainless, toolsteels and other high-alloy steels are not considered to be in this category.) The names of the recipients will be read during the annual banquet of the American Society for Metals on Thursday evening, Oct. 28.

An excellent committee has been appointed to determine the qualifications of candidates for the Distinguished Service Awards. J. M. Schlendorf, vice-president of Republic Steel Corp., is chairman, and Rufus E. Zimmerman, vice-president of U. S. Steel Corp., is vice-chairman. The personnel of the committee is listed in full on page 5. These men will judge the qualifications of candidates whose names are suggested to them.

Here is where the entire membership of the American Society for Metals can help. Let each one of you recall your experiences with alloy steels in the past; compare the early ignorance with present-day knowledge; write a letter giving the names of the people now living who, in your opinion, did an outstanding job in making this transformation possible; add what supporting remarks or evidence you think appropriate; and mail the letter to J. M. Schlendorf, chairman, Distinguished Service Awards Committee, Republic Building, Cleveland 1, Ohio.

The Awards Committee will consider nominations of outstanding men in all branches of this great field of engineering alloy steels (exclusive of the stainless, toolsteels and other high-alloy steels). The outline on the opposite page is presented to stimulate concrete thinking.

A glance at this brief outline will indicate that the Distinquished Service Awards Committee will need a lot of help from all A. S. M. mem-

bers to insure that distinguished work in all brances of the engineering alloy steel field (exclusive of toolsteels, stainless and other high-alloy steels) will be recognized.

Nominations for recipients of these awards should be sent immediately to Chairman Schlendorf. Letters should state specifically and in detail the work that the candidate has done and the reasons why he should be eligible for an award.

Suggested Basis for Selection of Candidates

I. Men who discovered, perfected and promoted the metallurgical processes
   1. Ferro-alloys and other raw materials
   2. Equipment and processes for making alloy steel
      (*a*) Furnaces
      (*b*) Auxiliaries
      (*c*) Control equipment
      (*d*) Refining processes and reagents
      (*e*) Alloy steel ingot and steel casting practice
   3. Forging and other mill processes adapted especially to alloy steels
   4. Heat treating techniques for alloy steels

II. Discoverers of advanced research techniques

III. Discoverers of improved inspection techniques

IV. Discoverers and perfecters of the alloy steels themselves
   1. Compositions
   2. Control and refinement of microstructure

V. Notable men in the organization and promotion of the alloy steel business

VI. Men responsible for notable applications in consuming industries
   1. Transportation industries
      (*a*) Automotive
      (*b*) Railroad
      (*c*) Aircraft
      (*d*) Marine
   2. Agricultural Machinery
   3. Power industries
      (*a*) Steam
      (*b*) Electrical
      (*c*) Gas
      (*d*) Water
   4. Machine industries
   5. Chemical and petroleum industries
   6. Ordnance

Distinguished Service Awards Committee

Chairman: J. M. Schlendorf, vice-president in charge of sales, Republic Steel Corp.

Vice-Chairman: Rufus E. Zimmerman, vice-president, U. S. Steel Corp.

Robert S. Archer , vice-president, Climax Molybdenum Co.

John Chipman, professor of metallurgy, Massachusetts Institute of Technology.

H. J. French, vice-president, International Nickel Co.

F. P. Gilligan, secretary-treasurer, Henry Souther Engineering Co.

W. E. Jominy, staff engineer, Chrysler Corp.

T. W. Lippert, editor, *Iron Age.*

I. C. Mackie, director of metallurgy and research, Dominion Steel & Coal Corp., Ltd.

Harry W. McQuaid, consulting metallurgist.

Fred P. Peters, editor, *Materials & Methods.*

Walter E. Remmers, president, Electro Metallurgical Corp.

E. S. Rowland, research metallurgist, Timken Roller Bearing Co.

Earl L. Shaner, editor, *Steel.*

A. E. White, director, engineering research institute, University of Michigan.

Clyde E. Williams, director, Battelle Memorial Institute.

Welding Society Announces Lecture Course As New Feature of Convention Program

With 67 papers covering every branch of the welding field, to be presented in 21 sessions during the National Metal Congress in Philadelphia, the American Welding Society promises a busy week for metal men interested in this important fabrication method. Supplementing this program of technical sessions, the American Welding Society's 29th annual meeting offers an innovation this year in the form of an educational lecture course.

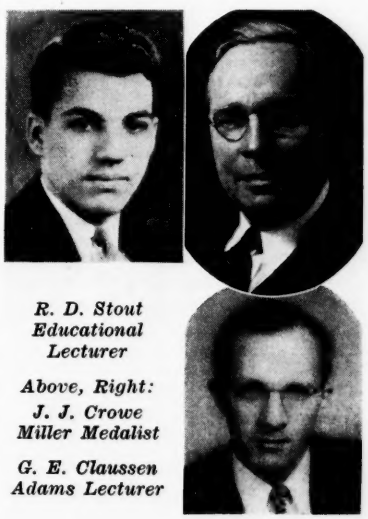
Headquarters for the Welding Society will be at the Bellevue-Stratford Hotel in Philadelphia, where all of the technical sessions will be held with the exception of the lecture course. Here the week's activities will open on Sunday afternoon, Oct. 24, with the traditional President's Reception. H. O. Hill, assistant chief engineer, Bethlehem Steel Co., president of the American Welding Society, will act as host.

The technical program will get under way in earnest early Monday morning with three simultaneous sessions on ship design; railroads; and storage tanks, pressure vessels and piping. Other subjects to be covered in succeeding sessions include brazing and metallizing, cutting, weldability, arcs and electrodes, resistance welding, inert-gas shielded-arc welding, maintenance, automatic welding, hard facing and flame hardening. An all-day symposium on ship structures research is scheduled for Tuesday, Oct. 26.

The educational series will consist of three lectures on "The Metallurgy of Arc Welds in Steel", and will be presented by R. D. Stout of Lehigh University. The lectures will be held on Monday, Tuesday and Wednesday afternoons, 4:30 to 6:00 p.m., at Convention Hall, so as to be convenient for those who wish to visit the National Metal Exposition.

Another important feature of the welding program will be the Adams Lecture on Monday evening, to be presented by G. E. Claussen of Reid-Avery Co. on "The Metallurgy of Covered Electrode Weld Metals".

The Adams Lecture will be preceded by the awards of prizes and medals. J. J. Crowe, assistant vice-president of Air Reduction Sales Co.,



R. D. Stout
Educational Lecturer

Above, Right:
J. J. Crowe
Miller Medalist

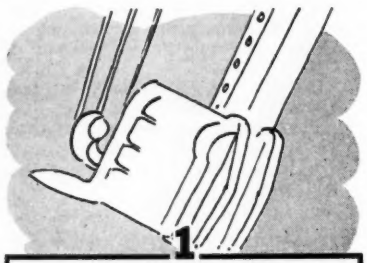
G. E. Claussen
Adams Lecturer

has been selected to receive the Samual Wylie Miller Memorial Medal. The award is made annually for meritorious achievement which has contributed conspicuously to the advancement of the art of welding and cutting. Mr. Crowe is a past presi-

(*Turn to page* 7)

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad, Received in the Library of Battelle Memorial Institute, Columbus, Ohio, During the Past Month



1a—General

1a-21. Seventy-Five Years of Progress in Ore Dressing. Arthur F. Taggart. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 82-125.
44 references.

1a-22. Techniques of Mineral Exploitation of the Future, Louis S. Cates and Howland Bancroft. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 759-790.
Exploration, mining, and beneficiation. 18 ref.

1a-23. Operating Results With the W. K. E. (HMS) Mobil-Mill. Robert W. Hernlund. *Mines Magazine,* v. 38, July 1948, p. 17-20, 45.
Previously abstracted from *Mining World,* v. 10, April 1948, p. 23-27. See item 1a-15. 1948.

1a-24. Industrial Minerals Research. Richard J. Anderson. *Mines Magazine,* v. 38, July 1948, p. 26-28, 34.
Progress in beneficiation techniques and new raw-material developments.

1a-25. Froth Flotation. L. A. Roe. *Chemical Engineering,* v. 55, July 1948, p. 96-98.
Present and potential application not only in ore beneficiation but also in miscellaneous chemical-industry separations—sizing; recovery of fossil resin from coal; cleaning peas and wheat; water purification; separation of a fungus from rye; and recovery of miscellaneous industrial wastes. 14 ref.

1a-26. The Electrostatic Separation of Several Industrial Minerals. Foster Fraas and Oliver C. Ralston. *Mining Technology,* v. 12, July 1948, T.P. 2408, 11 pages.
Electrostatic separation of sillimanite, kyanite, andradite, diopside, and zircon from commercial samples in order to illustrate what may be accomplished with other combinations of minerals. The information presented includes particle-surface conditioning and the adaptation of each separation to a particular type of separator. Such electrical phenomena may have future applications including compacting of abrasive powders and agglomeration and dispersion of other powders.

1b—Ferrous

1b-16. J & L Pushes Development of New York Iron Ore Mines. *Steel,* v. 123, Aug. 2, 1948, p. 66-67.
Mining and beneficiation methods.

1b-17. Magnetic Concentration Experiments Upon Iron Ores Used in North Lincolnshire Practice. L. Reeve. *Journal of the Iron and Steel Institute,* v. 159, July 1948, p. 275-280.
The design and installation of a small magnetic roasting kiln to determine to what extent the laboratory results could be duplicated on a somewhat larger scale. Full details of this kiln, together with those of a continuous magnetic separator of the Ball-Norton belt type. Preliminary results indicate that the kiln fully confirms the laboratory results through a wide range of ore feed and gas flow. Some consideration is also given to the use of suitable factors to express degree of concentration achieved, examples of which are given. The importance of the petrographic structure of iron ores in relation to their concentration is also indicated.

1c—Nonferrous

1c-52. Mining and Leaching Secondary Copper Ores. C. H. Thompson. *Mining Congress Journal,* v. 34, July 1948, p. 32-33, 54.
Leaching process devised to treat the little-known secondary copper ores of Carroll County, Va.

1c-53. New Chemical-Metallurgical Trends in the Treatment of Complex Iron-Nickel-Cobalt Ores. (In Russian.) G. G. Urazov and D. P. Bogatskii. *Izvestiya Academii Nauk SSSR, Otdelenie Khimicheskikh Nauk* (Bulletin of the Academy of Sciences of the U.S.S.R., Section of Chemical Sciences), no. 2, March-April 1948, p. 194-204.
An experimental and theoretical study of the physico-chemical nature of different Fe-Ni-Co ores was performed. This study provides basic data indicating the type of nickel complex compounds present in such materials which makes it possible to develop new methods for recovery of the metals. 16 ref.

1c-54. Values of pH in the Systems: $MeSO_4$ + MeO + H_2O. (In Russian.) B. V. Gromov. *Zhurnal Prikladnoi Khimii,* (Journal of Applied Chemistry), v. 21, March 1948, p. 260-272.
In the above equation "Me" stands for any metallic atom. Systems incorporating Zn, Cu, Cd, Al, Co, Fe, and Mn were studied. Applications to the hydrometallurgy of the nonferrous metals, and especially to that of zinc. 14 ref.

1c-55. Concentration of Miscellaneous Oxide Manganese Ores from Yavapai, Yuma, Maricopa, and Mohave Counties, Ariz. W. J. Long, J. V. Batty, and K. C. Dean. *Bureau of Mines, Report of Investigations* No. 4291, June 1948, 24 pages.

1c-56. Anaconda's Operation at Darwin Mines, Inyo County, California. Dudley L. Davis and E. C. Peterson. *Mining Technology,* v. 12, July 1948, T. P. 2407, 11 pages.
Geology, mineralization, mining, milling, and concentration procedures. There are four types of ore: high-grade Ag-Pb ores, milling-grade oxidized Pb-Ag ore, sulfide Pb-Zn milling ore, and high-grade tungsten ore.

For additional annotations indexed in other sections, see:
2a-10; 25c-60.

2a—General

2a-10. Seventy-Five Years of Progress in Smelting and Leaching of Ores. Frederick Laist. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 126-161.

2a-11. Some Factors Influencing the Performance of Cupola Fuels. C. C. Wright. *Iron Age,* v. 162, Aug. 12, 1948, p. 72-77.
Metal-to-fuel ratio, metal composition, cupola diameter, moisture content of blast, fuel reactivity and fuel size.

2b—Ferrous

2b-140. Seventy-Five Years of Progress in Iron and Steel; Coke, Pig Iron and Ingot Manufacture. C. K. King. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 162-198. A condensation. (Full text to be published in book form.)

2b-141. Trends in Pig-Iron Manufacture. T. P. Colclough and I. S. Scott-Maxwell. *Journal of the Iron and*
(Turn to page 8)

dent of the American Welding Society, and also a past national trustee, American Society for Metals.

Other awards to be presented by the society on Monday night include the Lincoln Gold Medal and the winners of the annual contest for papers emanating from industrial and university sources, conducted by the American Welding Society in conjunction with the Resistance Welder Manufacturers Association.

A program of ladies' entertainment is also being arranged. Registration for these events will be in the Blue Room at the Bellevue-Stratford.

A business session on Friday afternoon at 2:00 p.m., followed by the board of directors meeting, will close the week's activities. The complete program of the American Welding Society will be found on page 21, 23 and 25.

Non-Destructive Testing Society Plans Two-Day Meeting During Show

Four technical sessions are planned for the two-day annual meeting of the Society for Non-Destructive Testing, to be held during the National Metal Congress in Philadelphia. This society will have its headquarters and meetings at the Benjamin Franklin Hotel on Wednesday and Thursday, Oct. 27 and 28.

F. A. Firestone

An important feature of the Thursday afternoon session will be the presentation of the 1948 Mehl lecture, by Floyd A. Firestone. Title of the lecture will be "The Supersonic Reflectoscope, an Instrument for Nondestructive Testing and Measuring by Means of Sound Waves". Dr. Firestone was associate professor of physics at University of Michigan from 1923 to 1945. He is now a consulting physicist in Washington, D. C., specializing in problems of sound, vibration, electronics and supersonics.

Other interesting subjects on the program include a description of experimental work employing the radioisotopes cobalt and selenium; possible industrial applications of soft radiation; a mobile betatron at the U. S. Naval Ordnance Laboratory; and high-speed cine radiography. The complete program is on page 29.

Rod and Wire Symposium Will Be Highlight of A.I.M.E. Meeting Program

Left, E. O. Kirkendall, and Right, A. A. Smith, Jr., Secretary and Chairman, Respectively, of the Institute of Metals Division, A. I. M. E.

A symposium on "Rod and Wire Production Practice" will be an outstanding feature of the program being arranged by the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers for its annual fall meeting to be held in conjunction with the National Metal Congress in Philadelphia.

The Institute of Metals Division will meet during the first three days of the Congress, Oct. 25 through 27. Headquarters will be at Hotel Adelphia.

Both ferrous and nonferrous physical metallurgy subjects will be presented on this program, although the Iron and Steel Division of the A.I.M.E. will not convene this fall, its scope now being limited to production metallurgy. In all, the division has scheduled 40 papers, with sessions on properties of metals and alloys, microscopy and grain growth, constitution and precipitation, plastic deformation, diffusion and surface phenomena, and transformation. The complete program is given on page 27.

O. B. J. Fraser Symposium Chairman

The symposium on Rod and Wire Production Practice consists of eight papers on various phases of steel wire production, corrosion and heat resisting alloy wire, nickel and copper alloys, aluminum, and magnesium. The papers will be presented in morning and afternoon sessions on Tuesday, Oct. 26. O. B. J. Fraser, director of technical service, International Nickel Co., is chairman of the symposium committee responsible for the arrangements.

On the social side will be the Annual Autumn Dinner on Tuesday evening. I. of M. Chairman A. A. Smith, Jr., of Central Research Laboratories, American Smelting & Refining Co., will act as toastmaster, and Robert M. Brick, chairman of the Philadelphia Section, will welcome the guests. Principal speaker will be Waldo E. Fisher, professor of industry, Wharton School, University of Pennsylvania, who will present an appraisal of the Taft-Hartley Act.

The Powder Metallurgy Committee will have a luncheon meeting on Wednesday, and the Institute of Metals Executive Committee will meet Tuesday noon.

Ladies' Entertainment to Include Historical Visits

Rich in historical buildings and relics, Philadelphia is one of the most interesting cities in the country to visitors and sightseers. A fine program of entertainment has therefore been arranged for the ladies who will attend the National Metal Congress in October.

Interesting events on the program will include a sightseeing tour covering historical business and residential sections (with a stop at Independence Hall to see the Liberty Bell, Declaration Chamber and historical relics), a visit to Valley Forge and ride through the districts where many famous universities are located (with stops at Washington's headquarters, Washington Memorial Chapel, and other points of historical interest), luncheon and fashion show, and a visit to the Franklin Institute Planetarium.

Headquarters and registration for the ladies will be maintained in the Benjamin Franklin, Bellevue-Stratford, and Adelphia Hotels, headquarters of the various cooperating societies. A nominal registration fee will be required to cover a portion of the expense involved.

Steel Institute, v. 159, June 1948, p. 186-192.

Technical and economic trends in Britain.

2b-142. Economics of Ferrous Smelting. P. E. Cavanagh. *Canadian Metals & Metallurgical Industries*, v. 11, July 1948, p. 20-23, 37, 42.

Summary of a comprehensive study of various processes by the Ontario Research Foundation for the Ontario Research Commission. The main objects were to discover whether any known processes would be particularly suited to present and future Canadian conditions, and whether any new process would be of assistance in solving the scrap shortage in Canada. 28 ref.

2b-143. Use of Multiple Burners and Compressed Air to Improve Operating Rates of Open Hearth Furnaces. V. F. Corsini. *Industrial Heating*, v. 15, July 1948, p. 1174, 1176. A condensation.

Results of above. The net effect of a full year's experience was an increase in production rate of 15% over the best previous years and a 4.0% reduction in melting fuel.

2b-144. Effect of Sinter on Blast Furnace Practice. *Iron Age*, v. 162, July 29, 1948, p. 88-89. Condensed from paper by J. L. Mauthe.

Previously abstracted from original paper, *Blast Furnace and Steel Plant*, v. 36, July 1948, p. 817-824. See item 2a-9, 1948.

2b-145. The Application of Oxygen Enrichment to Side-Blown-Converter Practice. J. L. Harrison, W. C. Newell and A. Hartley. *Journal of the Iron and Steel Institute*, v. 159, July 1948, p. 281-290.

The practical utility of oxygen-enriched air for side-blown converter practice is demonstrated in a series of works-scale experiments; the higher thermal efficiency arising from oxygen enrichment is evaluated in terms of the various alternative factors such as shorter blowing time, higher steel temperature, and reduction in silicon and other fuel consumption. Detailed observations made during these trials compare the temperature increments and changes in chemical composition during the blow, with normal practice, and it is shown that with regard to the total of oxygen passed into the converter the combustion process is more efficient with oxygen-enriched air. It is also shown that the wear upon the refractories of the converter lining is not increased by the oxygen enrichment. 15 ref.

2b-146. Economic Advantages Offered by Side-Blow Converters. A. W. Gregg. *Steel*, v. 123, Aug. 23, 1948, p. 98, 100, 103-104.

Much less power consumption per ton of steel produced, less danger of over blowing and production of hotter metal for a given composition of the charge.

2b-147. Electric Furnace Oxygen Utilization. J. H. Eisaman. *Steel*, v. 123, Aug. 16, 1948, p. 112, 115-116, 118, 121-122.

Use of oxygen to afford greater stainless scrap charge, reduce heat time and improve chromium recovery. Advantages of using O_2 in stainless manufacture.

2c—Nonferrous

2c-42. The Refining of Gold. D. Thomson. *Journal of the Chemical, Metallurgical and Mining Society of South Africa*, v. 48, April 1948, p. 307-327.

Methods used for refining of bullion of the Witwatersrand, South Africa.

2c-43. Large-Scale Laboratory Production of Ductile Zirconium. W. J. Kroll, C. Travis Anderson, H. P. Holmes, L. A. Yerkes, and H. L. Gilbert. *Journal of the Electrochemical Society*, v. 94, July 1948, p. 1-20.

Data on the operation of a plant capable of producing about 60 lb. of zirconium per cycle. Operation of the latter involves reduction of zirconium chloride vapor with magnesium in a helium atmosphere and vacuum distillation.

2d—Light Metals

2d-18. The Electrolytic Production of Aluminum. Francis C. Frary. *Journal of the Electrochemical Society*, v. 94, July 1948, p. 31-40.

The development of methods. Problems involving heat loss, anode effect, and removal of aluminum from the bath, and modern methods of their solution. Construction and operation of the newest type of the Soderberg electrode is detailed and reference is made to the three-layer electrolytic refining process by which very high purity aluminum is obtained. 26 ref.

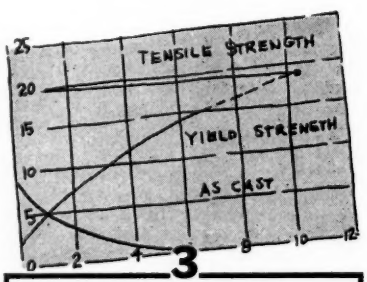
2d-19. Extraction of Alumina from High-Iron Bauxites. Frank J. Cservenyak, John Ruppert, and David E. Garen. *Bureau of Mines, Report of Investigations* No. 4299, June 1948, 29 pages.

Result of an investigation of processes for production of alumina from low-grade ores. Tests are restricted to sintering and leaching by the lime-soda sinter process. Flowsheet for this method.

2d-20. Super-Purity Aluminium. (Concluded.) *Metal Industry*, v. 73, July 23, 1948, p. 71-72; July 30, 1948, p. 86-88.

Procedures in scrap refining by three-layer electrolysis.

For additional annotations indexed in other sections, see:
15d-8; 16b-71-74.



3 PROPERTIES

3a—General

3a-65. The Micro-Mechanism of Fracture. Clarence Zener. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals*, v. 40B), 1948, p. 3-31.

Review of Griffith's contributions to the role of microcracks in brittle materials. Danger in utilizing the Griffith crack concept to interpret fracture phenomena in metals, because of the fundamental difference between them and amorphous materials, on account of the keying action of the grain corners. The initiation of cracks by slip bands and other theories regarding fracture. It was concluded that fracture is initiated by the act of deformation. Results of an investigation of fracture of armor plates under static and dynamic loading, conducted at Watertown Arsenal during the war. 41 ref.

3a-66. The Effect of Stress State on the Fracture Strength of Metals. John E. Dorn. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals*, v. 40B), 1948, p. 32-50.

Attempts to correlate some of the existing knowledge on fracture of metals in order to ascertain what stress functions dictate the conditions for fracture. Data from various researches showing the effects of different stress and strain histories. 21 ref.

3a-67. Effect of Strain on Fracture. George Sachs. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals*, v. 40B), 1948, p. 51-67.

Effects of prestraining at different temperatures on fracture stress and retained ductility, and of other experimental factors including cyclic loading. It was concluded that the process of fatigue consists of an alternate reduction in ductility by stretching, followed by partial recovery by compression. The gross effect then comprises a gradual reduction in ductility, with increasing number of cycles, until fracturing occurs. 13 ref.

3a-68. A Theory of Static Fatigue for Brittle Solids. Eugene F. Poncelet. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals*, v. 40B), 1948, p. 201-227.

Applies the concept of fracture propagation to explain the mechanism of delayed fracture in brittle solids. The factor of time is introduced into the expression which determines strength of such materials. It is indicated that the old concept of "strength" as "ability to withstand stress", must be abandoned, since brittle solids begin to fracture the instant a stress is applied. It is only because, for stresses substantially below their technical "strength", the static fatigue of brittle solids is of the order of generations, centuries, or even geological epochs that brittle solids have been assumed to possess "ability to withstand stress."

3a-69. Experimental Plans for Study of the Laws Governing Primary Deviation From Elastic Behavior of Materials Under Triaxial Stresses. L. H. Donnell. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals*, v. 40B), 1948, p. 244-245.

Proposed research.

3a-70. Fracture and Hydrostatic Pressure. P. W. Bridgman. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals*, v. 40B), 1948, p. 246-261.

Results of experiments show remarkable increases in ductility for mild steels at high hydrostatic pressures and a progressive change in the character of the fracture. Ductility imparted to completely brittle materials such as copper containing 8% phosphorus, and minerals such as limestone and rock salt. Glass does not acquire ductility, but it is extremely sensitive to surface conditions. Fundamental implications of these results.

3a-71. Fracture and the Structure of Metals. J. H. Hollomon. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals*, v. 40B), 1948, p. 262-274.

Recent publications on the subject. 41 ref.

(Turn to page 10)

To Direct Three Educational Courses

G. R. Fitterer

C. R. Austin

J. K. Stanley

Supplementing the regular technical sessions of the American Society for Metals during the National Metal Congress will be three educational lecture courses, which represent the culmination of months of planning on the part of the society's Educational Committee. The subjects were selected after careful consideration of lecture courses and symposiums previously presented, and the current needs of the metal industry. The subjects are "Properties of Metals in Materials Engineering", "Grain Control in Industrial Metallurgy", and "Metallurgy and Magnetism".

The series on "Properties of Metals in Material Engineering" will consist of eight lectures presented by individual speakers specializing in various phases of design problems. G. R. Fitterer, head of the department of metallurgical engineering at University of Pittsburgh, was appointed by the Educational Committee to act as coordinator for this series. His work consisted in organizing and outlining the lectures and working with the authors to insure a harmonious and inter-related whole.

The course on "Grain Control in Industrial Metallurgy" will consist of four lectures, also presented by individual speakers, covering fundamentals, recrystallization in iron alloys, grain control in copper alloys and in the light metals. C. R. Austin, assistant to president, Meehanite Metal Corp., and chairman of the Educational Committee, acted as coordinator for this series.

In the course on "Metallurgy and Magnetism" all three lectures will be presented by J. K. Stanley of the magnetic department of Westinghouse Electric Corp.

All of the lectures will be presented in Convention Hall in late afternoon and evening sessions. The complete schedule, with speakers, hours and dates of the lectures, and meeting rooms, is given in the program on page 19.

Meeting on Literature Classification and Filing

A round table discussion meeting on metallurgical literature classification and filing (with particular reference to punch card methods) will be sponsored by the American Society for Metals during the National Metal Congress in Philadelphia. The meeting will be held in Room 304, Convention Hall, on Tuesday afternoon, Oct. 26, at 2:00 p.m.

The meeting will be open to all who are interested in this subject. Tentative plans are under way to formulate a standardized system of classifying metallurgical literature that will be adaptable to punch card coding and filing.

Technical librarians interested in the metals field are also invited to attend, and the Science and Technology Group of the Special Libraries Association will cooperate in the project.

Power Breakfast Arranged

A "Power Breakfast" will be a new event this year in the line-up of activities scheduled for the National Metal Congress in Philadelphia. Scheduled for Tuesday morning, Oct. 26, the Power Breakfast will be attended by engineers in public utility and power plants.

Immediately after a talk by a recognized leader of the industry, the group will make an inspection trip to the new Southwark Station in Philadelphia. Costing $50,000,000, this new station has a capacity of 338,000 kw.

Reservations should be sent to William J. deMauriac, assistant superintendent, maintenance, Philadelphia Electric Co., 27th and Christian Sts., Philadelphia 46, Pa.

Two-Day Seminar On Cold Working Is Early Event

Opening event in the week-long series of technical sessions, meetings, educational lectures, and other metallurgical get-togethers of Metal al Congress Week will be a two-day seminar on the "Cold Working of Metals". Preceding the actual opening of the Congress and Exposition, the seminar will be held in five sessions on Saturday and Sunday, Oct. 23 and 24 in the Benjamin Franklin Hotel, Philadelphia.

John Chipman

Selection of the subject "Cold Working of Metals" was made by a committee appointed by the board of trustees of the American Society for Metals, with John Chipman, head of the department of metallurgy at Massachusetts Institute of Technology, serving as chairman. The cold work state continues to remain a troubling metallurgical mystery, which may receive some new light from the presentation of fundamentals and thrashing out of details in the discussion periods that will be provided by the seminar meetings.

M. Gensamer

The preparation and coordination of the series of subjects, and solicitation of speakers, has been carried on by M. Gensamer, who is assistant to director of research, Carnegie-Illinois Steel Corp. An outline of the seminar and program of meetings is given on page 25.

3a-72. The Speed of Propagation of Fracture Cracks. Edward Saibel. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40B), 1948, p. 275-281.

A theoretical expression for the speed of propagation of a brittle crack in a metal and its dependence on both the hydrostatic component of the stress system and the temperature.

3a-73. Summary of the Seminar. Wendell P. Roop. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40B), 1948, p. 290-311.

Summary of the papers in this volume. Appendices give resumes of Griffith's two papers in which the theory of microcracks was first stated, and explain the mathematical nomenclature of stress and strain.

3a-74. An Application of Dislocation Theory to Fracturing by Fatigue. E. S. Machlin. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40B), 1948, p. 282-289.

Previously abstracted from *National Advisory Committee for Aeronautics, Technical Note* No. 1489, Jan. 1948. See item 3a-10, 1948.

3a-75. Free Volumes of the Metallic Elements at Their Melting Points. S. S. Penner. *Journal of Chemical Physics,* v. 16, July 1948, p. 745-746.

Have found application in various semi-empirical treatments of physical-chemical phenomena. Calculated for 40 metallic elements.

3a-76. Industrial Metals of High Purity. Albert Portevin. *Metal Progress,* v. 54, July 1948, p. 69-70.

Their production and properties. Variation of a property in terms of percentage impurities (sometimes linear, but often not), beneficial effects of impurities, establishment of reasonable composition specifications, and deoxidation.

3a-77. Properties of Metals at Stratospheric Heights. P. Litherland Teed. *Aircraft Engineering,* v. 20, July 1948, p. 207-214.

Metallurgical problems involved in engineering for flight in the stratosphere. Chemical and physical aspects involved in properties and structures of various metals. Results of mechanical tests employed to learn more of the relationship between stratospheric conditions and metal behaviors. (English text of paper presented before l'Association Francaise des Ingénieurs et Techniciens de l'Aéronautique, Oct. 9, 1947.) 24 ref.

3a-78. Three Design Considerations in Selecting Resistance Alloys. C. P. Marsden. *Electrical Manufacturing,* v. 42, Aug. 1948, p. 116-120, 216, 218.

Heat resistance, specific resistance, and temperature coefficient requirements for electrical conductors employed to generate heat or control current. Offers suggestions for selection of those alloys which will best fit needs of a given application.

3a-79. Permanent-Magnet-Material. J. H. Goss. *Mechanical Engineering,* v. 70, Aug. 1948, p. 671-674.

Available permanent-magnet materials and the groups of alloys into which they fall. Some general considerations regarding permanency. Use of permanent-magnet to a gear drive.

3a-80. Evaluation of the Toughness of the Discs of Steam Turbines. (In Russian.) V. F. Yachenko. *Kotloturbostroenie* (Boiler and Turbine Manufacture), March-April 1948, p. 19-22.

In evaluating the toughness of the disks of steam turbines, the method of double calculation is applied first, using the influence of the "strain" of the rim and connections and strain in the disk; the method of triple calculation introduces the rim coefficient. 19 ref.

3a-81. New Alloy Has Improved Electrical Resistance Properties. *Materials & Methods,* v. 28, Aug. 1948, p. 62-63.

Alloy, called "Evanohm", and its use in manufacture of resistors.

3a-82. Bearing Metals. H. R. Clauser. *Materials & Methods,* v. 28, Aug. 1948, p. 75-86.

Requirements of sleeve bearing materials, and properties and characteristics of the many different bearing metals. Advice on selecting the proper bearing metal for a particular application.

3b—Ferrous

3b-97. Metallurgical Aspects of Brittle Fracture Phenomena in Mild Steels. I. G. Slater. "Fracturing of Metals," American Society for Metals (also *Transactions of American Society for Metals,* v. 40B), 1948, p. 68-81.

A series of factors which cause difficulty when attempting to achieve a fundamental explanation of brittle fracture. The metallurgical characteristics of a series of cases of brittle fracture during service. Principal factors which enhance liability to brittleness in steels, and strain-age phenomena.

3b-98. Fracture Dynamics. George Irwin. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40B), 1948, p. 147-166.

Attempts to clarify recent developments in the dynamics of rapid fracturing of ductile metals by means of a presentation and discussion of results of some Navy research on ductile and brittle fracture of ship-plate steels. Brief mathematical derivation of the velocity of brittle fracture. 14 ref.

3b-99. Plastic Flow and Rupture of Steel at High Hardness Levels. T. A. Read, H. Markus, and J. M. McCaughey. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40B), 1948, p. 228-243.

Stress-strain relations for a medium carbon steel were measured over a range of hardness levels from Rockwell C-40 to 66. The data indicate that stress increases as the nth power of the strain for strains greater than 0.04. The strain hardening exponent n so determined has a minimum value when specimens of these steels are tempered in the neighborhood of 500° F. It is suggested that the low values of energy absorption in the torsion-impact and notched-bar bend tests for heat treated medium and high-carbon steel specimens tempered near 500° F. may result from the low value of the strain-hardening exponent obtained after this tempering treatment. 13 ref.

3b-100. Magnetization Curves for Ferromagnetic Single Crystals. H. Lawton and K. H. Stewart. *Proceedings of the Royal Society,* ser. A, v. 193, April 22, 1948, p. 72-88.

Curves for iron single crystals above the "knee" are derived on the basis of domain theory for the case where the specimen is finite and the field is applied in an arbitrary direction with respect to the crystal axes. It is shown that in many cases the demagnetizing field must be such as to make the field actually acting in the crystal have a direction of symmetry, whatever the direction of the applied field. A method for correcting for the effect of internal strains. 14 ref.

3b-101. Inter-Relation of Hardenability and Isothermal Transformation Data. W. I. Pumphrey and F. W. Jones. *Journal of the Iron and Steel Institute,* v. 159, June 1948, p. 137-144.

It has been suggested by previous workers that during continuous cooling the fractional nucleation times are additive in any one transformation range, and that transformation begins when the sum of such times reaches unity. By an extension of this concept, continuous-cooling data were calculated from the isothermal transformation diagram, and the method was used to calculate the hardness along a Jominy bar. For the three steels considered (a hypereutectoid Cr-Mo steel and two hypo-eutectoid Ni steels), the hardenability curves were found to be in reasonable agreement with those determined experimentally. 10 ref.

3b-102. A Magnetic Study of Stainless-Steel Wires. P. T. Hobson, E. S. Chatt, and W. P. Osmond. *Journal of the Iron and Steel Institute,* v. 159, June 1948, p. 145-157.

A method developed for examination of very fine single wires for magnetic properties; results of experiments on Fe-Ni-Cr wires and crystal structures of these two-phase cold worked alloys. Typical remanence curves for such wires were analyzed by a modification of the method developed by Richer, and reasonable values for preferred directions of crystal-orientation and domain-orientation were obtained. Possible factors governing the acquisition of irreversible magnetization at higher fields than that giving maximum susceptibility are discussed. Observed changes in magnetic properties after different degrees of heat-treatment are described, and results of analysis of remanence curves and the incidence of irregularities are discussed. Irregularities observed in some wires which were not heat-treated after cold work are described and suggestions concerning the factors leading to their appearance are made. Finally, a tentative equilibrium diagram of the 12%-Cr, 12%-Ni alloy is shown for varying small amounts of carbon. 38 ref.

3b-103. Brittle Fracture in Mild-Steel Plates. II. (Continued.) C. F. Tipper. *Engineering,* v. 165, June 11, 1948, p. 568-571; June 18, 1948, p. 592-595; June 25, 1948, p. 605-607.

Continues report of conference held in Cambridge, England, Oct. 26, 1945. Results of experimental work using high-speed notch tests at low temperatures. Microstructures of the fractured edges of plates which failed in service were examined, and then attempts were made to reproduce these fractures under controlled conditions. The technique of notching and notch profiles.

3b-104. Alloy Iron Castings Show Tensile Strength Almost 60,000 Psi. as Cast. *Inco Magazine,* v. 22, Summer 1948, p. 4-6.

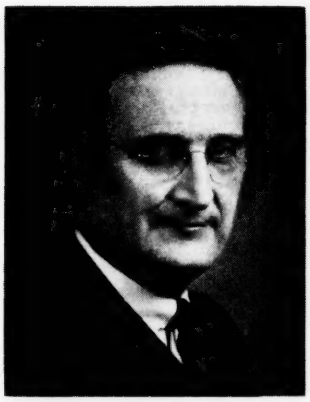
Properties and applications of "Ni-Tensylirons" (new gray-iron alloys containing variable amounts of Ni and Mo—up to 3% for the former and 0.6% for the latter).

3b-105. Tests Below 300° F. Minus Prove Low Temperature Value of New Alloy Steel. *Inco Magazine,* v. 22, Summer 1948, p. 16-19, 26.

8½-Ni welded pressure vessels filled with liquid nitrogen withstood blows of 1500 ft. lbs. on welds, while

(Turn to page 12)

A.S.M. Gold Metal Honors Francis Frary



Francis C. Frary

Fourth recipient of the Gold Medal of the American Society for Metals will be Francis Cowles Frary, director of research, Aluminum Co. of America. The medal, which will be presented to Dr. Frary during the annual banquet of the society on Oct. 28, is awarded "for outstanding metallurgical knowledge and great versatility in the application of science to the metal industry, as well as exceptional ability in the diagnosis and solution of diversified metallurgical problems".

Dr. Frary has been with the Aluminum Co. for 30 years, and has been personally active in all phases of research on aluminum, from the processing of bauxite and the production of the metal, to its final application. Frary has made important contributions in such diverse fields as the electrothermal production of alumina and aluminum alloys, electric calcination of coke for the production of electrodes, molding sands used for casting magnesium alloys, and aluminum alloys.

Frary Metal, his first significant contribution to metallurgy, was a lead alloy for bearings, hardened with calcium and barium. Developed in 1914 with Sterling Temple, the alloy exhibited the then unique phenomenon of age hardening.

Working with William Hoopes, Frary produced in 1920 the first aluminum of 99.99% purity by a unique method of electrolytically refining aluminum in a three-layer fused salt bath. Electrolytically refined aluminum has been used by Dr. Frary's research staff to establish the equilibrium diagrams of important aluminum alloy systems.

The Gold Medal winner for 1948 received his Master's degree in science from the University of Minnesota, where he later taught for four years. He then took charge of the research laboratories of the Oldbury Electrochemical Co. of Niagara Falls, and at the outbreak of World War I, became associated with the Chemical Warfare Service in an advisory capacity. At the end of the war he joined the Aluminum Co. of America.

Canadian Luncheon Planned

The six Canadian chapters of the American Society for Metals will again participate in the annual Canadian Luncheon during the National Metal Congress in Philadelphia. The luncheon will be held on Tuesday, Oct. 26 in the Benjamin Franklin Hotel, with members from the Montreal, Ontario, British Columbia, Manitoba, Ottawa Valley, and Western Ontario Chapters attending. Tickets must be purchased in advance, either at the registration desk at the Benjamin Franklin Hotel or at Convention Hall.

Willard Dow to Receive A.S.M. Medal for Advancement of Research

Willard H. Dow, president of the Dow Chemical Co., Midland, Mich., has been elected to receive the A.S.M. Medal for the Advancement of Research for 1948. Presentation of the medal, plaque and citation will be made at the annual banquet of the society, to be held in Philadelphia on Oct. 28 during the National Metal Congress and Exposition.

Qualifications for the Research Medal state that "the candidate shall be an executive in an industrial organization, the principal activity of which is the production or the fabrication of metals. He shall be one, who, over a period of years, has consistently sponsored metallurgical research or development, and, by this foresight and his influence in making available financial support, has helped substantially to advance the arts and sciences related to metals".

The phenomenal rise in the production, fabrication and use of magnesium during the war years and its present tried and tested position as a common structural material stand in mute testimony to Dr. Dow's qualifications for this award. The fascinating story of the pioneering efforts of the Dow Chemical Co. in the development of magnesium is graphically told by Dr. Dow in the April 1944 issue of *Metal Progress*, page 675.

Dr. Dow was born in Midland, Mich., home of the enterprise he now heads. He began his career with the Dow Chemical Co. upon his graduation from the University of Michigan, where he received his B.S. in Chemical Engineering. He served successively as chemical engineer,

Willard H. Dow

assistant general manager, general manger, and president and chairman of the board. He is a director of various other corporations, and also serves as advisor to Resources Division, Office of Quartermaster General; member of the advisory committee, Army and Navy Munitions Board; and member of the board of control, Michigan College of Mining and Technology.

Dr. Dow holds honorary degrees from University of Michigan, Michigan College of Mining and Technology, and Illinois Institute of Technology. In recent years he has also been awarded the Chandler Medal of Columbia University (1943), the Gold Medal of the American Institute of Chemists (1944), and the Chemical Industry Medal of the American Section, Society of Chemical Industry (1946).

carbon steel shattered under 1000 ft. lbs.

3b-106. The Growth of High-Speed Steel and Related Alloys During the Past 25 Years. W. R. Hardwick. *Alloy Metals Review,* v. 6, June 1948, p. 2-8.

The development of high-speed steel is reviewed. It is suggested that the three types evolved and standardized have reached some degree of finality as regards composition, although knowledge of heat treatment and application is still growing.

3b-107. Steels For Forging. Part II. The Molybdenum and Vanadium Alloys. Lester F. Spencer. *Steel Processing,* v. 34, July 1948, p. 366-369.

Properties of various compositions.

3b-108. Carburizing and Nitriding Steels. R. F. Johnston. *Steel Processing,* v. 34, July 1948, p. 370-374.

Suitable compositions; and various factors involved, such as microstructure. Furnaces required.

3b-109. Galling Tests of Graphitic and Regular Oil Hardening Die Steels. A. F. Sprankle and R. W. Dayton. *Metal Progress,* v. 54, July 1948, p. 65-69.

An Amsler wear-testing machine was used to compare the antigalling characteristics of a conventional die steel of oil hardening, nondeforming type with a wrought graphitic steel both hardened and tempered to C-61 or harder, when rubbing against soft S.A.E. 1015 steel at pressures up to about 100,000 psi., and at various rubbing speeds. The graphitic steel required approximately twice as high a load for galling as the conventional die steel.

3b-110. Stabilization of Austenitic Stainless Steel. Samuel J. Rosenberg and John H. Darr. *Iron Age,* v. 162, July 22, 1948, p. 81. A condensation.

Previously abstracted from *Journal of Research of the National Bureau of Standards,* v. 40, April 1948, p. 321-338. See item 3b-69, 1948.

3b-111. Better Steel Devised for Hubbing. A. L. Pranses. *American Machinist,* v. 92, July 29, 1948, p. 84-87.

Compositions and properties of four types of air-hardening steel and compares them with water-hardening and oil-hardening irons and steels. States that plastic-mold manufacturers can realize substantial savings by adopting air hardening steels which are easier to hub and to heat treat and will retain hardness exceeding Rockwell 50-C at temperatures up to 900° F.

3b-112. Recent Developments Concerning the Properties of Cast Steels. C. W. Briggs. *Transactions of the American Society of Mechanical Engineers,* v. 70, Jan. 1948, p. 37-47.

Property ranges for strength and ductility are given for cast steels receiving different heat treatments. The end-quench hardenability test was used to study a number of carbon and alloy cast steels. It was found that hardenability values of cast steels are similar to those of wrought steels of comparable analyses and grain sizes. Hardenability curves for typical carbon cast steels and hardenability bands for a number of low-alloy cast steels. No one alloy cast steel produces the best impact resistance, for all types of heat treatments, at all testing temperatures.

3b-113. The Role of Meehanite Metal Castings in Engineering Production. C. R. Austin. *Transactions of the American Society of Mechanical Engineers,* v. 70, Feb. 1948, p. 99-109.

The engineering facts concerning high-strength cast irons, their production, and important applications.

3b-114. Temper Brittleness; Some Results of Notched-Bar Impact and Explosion Tests. Fr. Poboril and V. Koselev. *Iron and Steel,* v. 21, June 1948, p. 289-294; July 1948, p. 319-322. Translated from *Hutnické Listy* (Metallurgical Topics), v. 1, Nov. 1946, p. 97-101; Dec. 1946, p. 130-133; Jan. 1947, p. 155-158.

Previously abstracted from original source. See item 3-303, 1947.

3b-115. When and How to Use Gray Iron. T. E. Eagan. *Foundry,* v. 76, Aug. 1948, p. 84-91.

Information on properties, microstructures, and heat treatment of the various types, as an aid to the designer. Includes charts, diagrams, and photomicrographs. Mechanical properties, corrosion resistance, castability, machinability, heat resistance, wear resistance, and various physical properties.

3b-116. Viscosity. E. T. Linacre. *Iron and Steel,* v. 21, July 1948, p. 315-318.

A critical survey of the viscometry of molten iron-carbon alloys; methods of measurement. (To be continued.) 15 ref.

3b-117. Cast Crankshafts. R. J. Love. *Journal of the Iron and Steel Institute,* v. 159, July 1948, p. 247-274.

Published information on cast crankshafts and discusses the following aspects: the behavior of cast crankshafts in service and influence of various material properties; cast materials, surface treatments, and special heat-treatments; features of design; and advantages of using cast crankshafts. The results of various tests on cast crankshafts and on the more conventional forged crankshafts are given and indicate that cast crankshafts normally have lower bending fatigue-strengths than forged shafts, the materials used for forged crankshafts having, in general considerably greater tensile strengths than the cast crankshafts. 116 ref.

3b-118. Gray Cast Iron; Relationship of Composition and Properties. R. G. McElwee. *American Foundryman,* v. 14, Aug. 1948, p. 46-49.

Effects of elements considered in a specification. Selection of iron composition for sound casting design.

3b-119. Unappreciated Advantages of Modern Gray Iron. Frederick G. Sefing. *Mechanical Engineering,* v. 70, Aug. 1948, p. 667-670, 674.

Gray iron, its range of properties, engineering applications, limitations, and specifications.

3b-120. Strength Limitations in the Use of SAE 4340 Steel Forgings. E. J. Ripling and L. J. Ebert. *Iron Age,* v. 162, Aug. 5, 1948, p. 88-93.

Utilizing the standard tensile test and the static notched-bar tensile test, for investigation of the suitability of S.A.E. 4340 steel for applications undergoing exposure to various service conditions. Physical-property data for S.A.E. 4340 heat treated commercially, as compared with laboratory (ideal) heat treatment. Quantitative data indicates the effect of tempering temperature on regular tensile properties as well as notch properties when testing at room temperature and at −70° F.

3b-121. Electric Conductivity of Ferro-Magnetic Substances at Low Temperatures. (In Russian.) S. V. Vonsovsky. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki* (Journal of Experimental and Theoretical Physics), v. 18, Feb. 1948, p. 219-223.

The computation of electrical resistance of ferro-magnetic substances at low temperatures is based on the conductivity of "external" s-electrons and the conditions of magnetization of "inner" d-electrons. Collisions of s-electrons and "ferromagnetism" ("back surge" of d-electrons) during magnetization near saturation, at temperature T_s, causes additional electrical resistance, specifically for ferromagnetic substances. 11 ref.

3b-122. Mechanical Properties and Composition of Castings for the Base Supports of a Hydro-Turbine. (In Russian.) V. I. Smirnov. *Kotloturbostroenie* (Boiler and Turbine Manufacture), March-April 1948, p. 22-24.

Results of investigating mechanical properties and composition of iron castings tempered from 350 and 550° C. Chemical composition and mechanical properties of samples from two base supports which have been long in use.

3b-123. Oxidation Och Avkolning vid Värmning Och Valsning. (Oxidation and Decarburization During Heating and Rolling.) Gunnar Wallquist. *Jernkontorets Annaler,* v. 132, May 1948, p. 123-169.

Investigates existing theory of chemical processes of above. Factors involved, such as chemical composition of steels, concentration of alloy components, temperature and duration of heat treatment or rolling. Influence of different gases on these phenomena. (To be continued.)

3b-124. Nodular Cast Irons. H. Morrogh and J. Grant. *Metallurgia,* v. 38. July 1948, p. 153-160.

A process whereby graphite formed on solidification is in the nodular form. The resulting iron is a very distinct improvement on normal flake graphite irons. The method and the properties attainable.

3b-125. Nickel Alloy Steels. *Machinery,* (London) v. 73, July 15, 1948, p. 59-64.

Their properties and applications.

3b-126. When and How to Use Cast Iron. T. E. Eagan. *Tool Engineer,* v. 11, Aug. 1948, p. 17-20.

This resume of a paper presented at the joint session of the A.S.T.E. and A.F.A., Chicago, Sept. 1947, describes physical characteristics and qualities which make gray iron a dependable engineering material.

3c—Nonferrous

3c-52. Metallurgical Topics. *Engineer,* v. 185, June 25, 1948, p. 616-617.

Properties of Cu-Cr and Cu-Ni-Cr alloys, the hot-quenching of steel, and application of hardenability to test methods.

3c-53. Transmission of Monoenergetic Slow Neutrons Through Solid Solutions and Mechanical Mixtures of TiC and WC. S. S. Sidhu. *Journal of Applied Physics,* v. 19, July 1948, p. 639-641.

Experimental results.

3c-54. The Young's Modulus and Strain Coefficient of Resistivity of Some Bismuth Rich Alloys. G. C. Kuczynski and J. T. Norton. *Journal of Applied Physics,* v. 19, July 1948, p. 683-686.

The above were determined for some Bi-Pb, Bi-Sn, Bi-Se, and Bi-Ni alloys. It was found that the modulus of elasticity decreases rapidly in the regions of solid solution, contrary to the predictions of Guillet. The strain coefficient of resistivity was found to increase rapidly within the limits of solid solubility while the stress coefficient of electrical resistivity remained constant.

(Turn to page 14)

Cohen Will Present Campbell Lecture At Annual Meeting

Morris Cohen, professor of physical metallurgy at M.I.T., prolific author, A.S.M. Howe medalist, and authority on heat treatment of high speed steels, has been selected to deliver the Edward deMille Campbell Memorial Lecture of the American Society for Metals on Oct. 27. The

Morris Cohen

lecture is presented annually during the National Metal Congress on Wednesday morning, immediately following the annual meeting of the society at 10:00 a.m.

Dr. Cohen received the degrees of Bachelor of Science and Doctor of Science in metallurgy at the Massachusetts Institute of Technology in 1933 and 1936, respectively. He was an assistant in the department of metallurgy at the Institute in 1934-36, and rose from instructor in 1936-37 to professor in 1946. From 1943 to 1946 he was also an associate director of the Manhattan Project.

He is the author or co-author of no less than 15 technical papers in the A.S.M. *Transactions* during the past ten years, one of which won him the society's Henry Marion Howe Medal in 1945. Outstanding among these papers was a series on tempering of toolsteel, and another on dimensional stability of steels, part 4 of which will be presented at the A.S.M. technical session on Monday morning, Oct. 25.

The subject of the Campbell Lecture has not yet been announced, but a resume of it will appear in *Metal Progress* for November.

Metallographic Exhibit

The Third Annual A.S.M. Metallographic Exhibit will occupy a prominent area in Convention Hall during the National Metal Exposition in Philadelphia. All interested metallographers are invited to submit their best micrographs for the display.

Prizes and awards will be given for the best micrographs in 12 classifications. Entries must be delivered between Oct. 1 and Oct. 20 to the Metallographic Exhibit, c/o W. H. Eisenman, National Metal Exposition, Commercial Museum, 34th St. below Spruce, Philadelphia. The complete rules are given on the inside back cover.

Western Metal Show

Plans for the Sixth Western Metal Congress and Exposition, to be held in Los Angeles, April 11 through 15, 1949, are now under way.

The Western Metal Congress will be held under the sponsorship of the American Society for Metals in cooperation with the western sections of 20 national technical societies having units on the Pacific Coast. The Exposition will be held in the Shrine Auditorium in Los Angeles, and A. S. M. headquarters will be at the Biltmore Hotel.

The Western Metal Congress is scheduled on a two-year basis, the last one having been held in Oakland, Calif., in 1947. Floor plans for the 1949 exposition will be ready for distribution to prospective exhibitors in 30 days.

College Reunions Planned

College reunions will again climax the A.S.M. Annual Meeting and Campbell Memorial Lecture on Wednesday, Oct. 27, during the National Metal Congress. Alumni luncheons have been scheduled for that day by the leading technical schools and colleges of the country.

All of the luncheons will be held at the Benjamin Franklin Hotel, Philadelphia, at 12:00 noon. Reservations must be made by 1:00 p.m. of the day preceding the luncheons. They can be made and tickets purchased at the registration desks in Convention Hall or in the Benjamin Franklin Hotel.

Philadelphia Chapter to Man Booth at Metal Exposition

W. J. DeMauriac

Officers of the Philadelphia Chapter A. S. M. will act as hosts during the National Metal Congress and Exposition. With Chapter Chairman William J. deMauriac of Philadelphia Electric Co. in charge, the officers and executive committee will staff and equip a booth at the Exposition in Convention Hall, where they will be available to be of service to out-of-town guests.

University of Pennsylvania, Drexel Institute of Technology and Temple University will also have displays featuring the educational opportunities of the Philadelphia Section and their co-operation with the American Society for Metals.

Congress Visitors Invited To Inspect Local Plants

Plant inspection trips to a number of important industrial firms and government properties are being scheduled for visitors to the National Metal Congress in Philadelphia. The trips are being arranged for Tuesday, Thursday and Friday mornings, Oct. 26, 28 and 29.

A list of the plants to be visited and the dates will be carried in the Official Program. Arrangements for individual trips should be made a day in advance at the registration desk at either Convention Hall or the Benjamin Franklin Hotel. Transportation will be provided so that visitors can proceed in groups.

The trips are being planned by a committee of Philadelphia Chapter members under the chairmanship of Russell Knoblauch, assistant to general sales manager, Brown Instrument Co.

Metal Treating Institute Meets

The annual meeting of the Metal Treating Institute will be held at the Adelphia Hotel, Philadelphia, starting on Friday, Oct. 22 and closing on Monday, Oct. 25, at noon, just before the opening of the National Metal Exposition.

3c-55. Resistance-Thermometer Bridge. S. S. Stack. *General Electric Review*, v. 51, July 1948, p. 17-21.

Compactness, ease of manipulation, and high accuracy without necessity for thermostatic control are attained in new bridge in which all coils of major importance are of a gold-chromium alloy; the exceedingly low temperature coefficient of resistance eliminates the necessity for thermostatic temperature control. Properties of the alloy; construction and operation of the bridge.

3c-56. A Note on Age-Hardening Ni-Bronze. G. P. Contractor and S. Viswanathan. *Journal of Scientific and Industrial Research*, v. 7, March 1948, p. 108-113.

Results obtained during investigation on properties of this alloy and to see whether, by suitable heat treatment, physical properties could be controlled to make it suitable as a bearing material. Composition and properties for high-duty bronzes and heat treated 88:5:5:2 alloy (Cu-Ni-Sn-Zn).

3c-57. Heat Transfer to Water Boiling Under Pressure. E. A. Farber and R. L. Scorah. *Transactions of the American Society of Mechanical Engineers*, v. 70, May 1948, p. 369-380; discussion, p. 380-384.

The film coefficient of heat transfer from a hot metal surface to a boiling liquid was estimated from experiments with an electrically heated wire submerged in the liquid. When water was boiled at atmospheric pressure, different heated metals gave different boiling curves. At different elevated pressures, the same metal gave different boiling curves. Data for nickel, tungsten, Chromel A, and Chromel C.

3c-58. The Superconductivity of Lanthanum and Cerium. W. T. Ziegler. *Journal of Chemical Physics*, v. 16, Aug. 1948, p. 838.

Results of measurements of the variation with temperature of the magnetic permeability of lanthanum and cerium.

3c-59. Elektrisches Verhalten und Allotropie von Uran. (Electrical Behavior and Allotropy of Uranium.) Georg Balz. *Metallforschung*, v. 2, May 1947, p. 144-146.

Electrical resistances of uranium melted in a vacuum between 0 and 1000° C. and the appearance of fluctuating changes at about 670 and 780° C. The reversibility of these changes, which indicate the existence of allotropic modifications of this element.

3c-60. Uber den Einfluss von Quecksilber auf die Festigkeitseigenschaften einer Magnesium-Mangan-Legierung. (The Effect of Mercury on the Strength Properties of a Magnesium-Manganese Alloy.) Walter Bulian. *Metallforschung*, v. 2, May 1947, p. 158-160.

The Mg-alloys contained 1.8% Mn and from 0.2 to 1.8% Hg. They were microscopically examined, tested for their strength properties, age hardening effects at higher temperatures and corrosion resistance.

3c-61. Ueber die Dauerstandfestigkeit von Zinklegierungen. (The Creep Strength of Zinc Alloys.) O. H. C. Messner. *Schweizer Archiv*, v. 14, May 1948, p. 147-156; June 1948, p. 182-190.

Short and long-time creep tests are investigated and results are discussed. 107 ref.

3c-62. Berechnung der Zugfestigkeit von Metallen und ihrer Geschwindigkeits- und Temperaturabhängigkeit. (Calculating the Tensile Strength of Metals and Its Dependence on Rate and Temperature.) Albert Kochendorfer. *Metallforschung*, v. 2, June 1947, p. 173-186.

How to calculate the multi-crystal expansion curve and its tensile strength, and the effect of the rate and temperature of testing on the tensile strength of Al and Cu. Methods of calculating the tensile strengths of other metals. 32 ref.

3c-63. Alloys for Stereotyping. Part 2. R. G. Harper. *Electrotypers & Stereotypers Journal*, v. 13, July 1948, p. 2, 4, 24.

Properties of above alloys. Comparison of melting points and sequence of solidification. (To be continued.)

3d—Light Metals

3d-37. New Magnesium Alloys Offer Superior Properties. Kenneth Rose. *Materials & Methods*, v. 28, July 1948, p. 66-69.

Higher strength results from use of zirconium; cerium additions in another alloy provide better strength at high temperatures.

3d-38. Rare Metals Improve Magnesium Alloys. *Iron Age*, v. 162, July 22, 1948, p. 83.

How Zr and Ce are used to produce high strength, toughness, and resistance to creep at high temperatures.

3d-39. Aluminium Alloys. 2. Wrought Alloys. G. Fitzgerald-Lee. *Aluminium and the Non-Ferrous Review*, v. 13, Jan.-March 1948, p. 1-2, 4.

Compositions and properties of the British types.

3d-40. Magnesium Casting Alloys. *Metal Industry*, v. 73, July 23, 1948, p. 66, 73.

Investigation carried out with the magnesium-aluminum-zinc-manganese alloy AZ 92, which in the initial experiments was melted in a steel crucible. The beryllium was added to the magnesium in the form of an aluminium-beryllium master alloy containing 5.3% beryllium, the temperature adjusted to about 760° C., and the zinc and manganese chloride then stirred in. Results of this procedure.

3d-41. The Properties of Extruded Aluminium-Alloy Bar. L. Northcott, D. McLean and O. R. J. Lee. *Engineering*, v. 166, July 23, 1948, p. 93-95.

Results of an investigation into the effect of extrusion through die plates, having 1, 2, 3, or 4 holes, on the mechanical properties of the bars.

For additional annotations indexed in other sections, see:

4b-50-55; 6b-91; 9a-59-61; 9b-45; 11-206; 19a-168; 23b-39; 27a-108-114-118.

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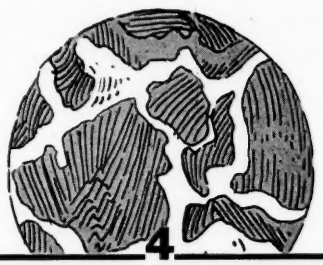


4 CONSTITUTION and STRUCTURE

4a—General

4a-33. Recrystallization. E. C. Williams. *Journal of the Birmingham Metallurgical Society*, v. 28, June 1948, p. 75-81; discussion, p. 82-84. Based to a large extent on a recent paper by Maurice Cook and T. H. Richards.

Fundamental principles of recrystallization of cold worked metals.

4a-34. The Metallic State. Linus Pauling. *Nature*, v. 161, June 26, 1948, p. 1019-1020.

Resonating-valence-bond theory of the electronic structure of metals.

4a-35. Calculation of the Heat of Fusion of the Carbide and Silicide of Iron. (In Russian.) E. I. Akhumov. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 21, March 1948, p. 227-234.

Calculations are presented, based on literature for melting points of the system Al-Si, Fe-FeSi, and Fe-Fe_3C. These values agree with those obtained by use of Le Chatelier's equation, if it is assumed that the silicide and carbide molecules each contain 6 atoms of iron in the liquid state: $(FeSi)_6$ and $(Fe_3C)_2$.

4a-36. X-Ray Diffraction Investigation of Minor Phases of 20 High-Temperature Alloys. B. M. Rosenbaum. *National Advisory Committee for Aeronautics, Technical Note* No. 1580, July 1948, 28 pages.

Use of X-ray diffraction methods to identify minor phases persent in the following high-temperature alloys in current use: 16-25-6, 17 W, 19-9 DL, Discaloy 25, S 590, N 155, K-42-B, Refractaloy 26, Nimonic 80, Inconel W, Inconel X, Inconel, Vitallium, 61, Stellite No. 6, 6059, 422-19, X-40, S 816, and Hastelloy B. 12 ref.

4a-37. Structure of Abraded Surfaces. J. B. Dance and D. J. Norris. *Nature*, v. 162, July 10, 1948, p. 71-72.

An investigation into the effect of abrasion on hardness and microstructure of surface and subsurface layers in the fatigue of metals and alloys.

4a-38. Clustering Phenomena in Solid Solution. A. Opinsky and R. Smoluchowski. *Physical Review*, ser. 2, v. 74, Aug. 1, 1948, p. 343.

The fundamental principles of the phenomena, especially as applied to metallic solid solutions, and particularly to Ag-Cu alloys. Observed structures are explained on a theoretical basis; and it is stated that other metallic-solid-solution phenomena can be explained similarly, for instance the influence of silicon on the mechanism of deformation of alpha-iron, and the precipitation of Fe_4N from alpha-iron.

4b—Ferrous

4b-47. The Decomposition of Austenite by Nucleation and Growth Processes.

(Turn to page 16)

Officers Installed On Wednesday at Annual Meeting

A unanimous ballot for the election of A.S.M. national officers will be cast by the secretary at the annual meeting of the society on Wednesday morning, Oct. 27, in the ballroom of the Benjamin Franklin Hotel, Philadelphia. The new officers were selected by the nominating committee last May, and in accordance with the constitution of the A.S.M., no additional nominations having been received by July 15, nominations were declared closed.

The new president of the American Society for Metals, who will take office at the annual meeting, is Harold K. Work, manager of research and development of the Jones & Laughlin Steel Corp. Arthur E. Focke, chief metallurgist for Diamond Chain Co., Inc., will be vice-president, and William H. Eisenman has been re-elected secretary.

Two new trustees, elected to serve for two years, are Frederick J. Robbins, vice-president and metallurgical engineer for Plomb Tool Co. and also president of Sierra Drawn Steel Corp., and Harry P. Croft, director of technical control and research, midwestern district of Chase Brass and Copper Co.

During the annual meeting the president, secretary and treasurer will give their reports covering activities of the society during the past year. A change in the Constitution and Bylaws of the society will also be voted upon. This change concerns distribution of publications; details were published in the July issue of *Metals Review,* page 27.

In addition to the new officers named above, the board of trustees includes E. L. Spanagel, treasurer; E. G. Mahin, C. M. Carmichael, trustees, and F. B. Foley, immediate past president.

University to Have Open House

The department of metallurgical engineering of the University of Pennsylvania has announced an open house during Metal Congress week. The department headquarters and laboratories are conveniently close to Convention Hall. Visitors will be cordially welcomed and the school's facilities demonstrated. R. M. Brick is director of the department.

Gas Breakfast Wednesday

The traditional Industrial Gas Breakfast, sponsored by the Industrial and Commercial Gas Section of the American Gas Association, will be held Wednesday morning, Oct. 27, at 8:30 a.m. in the Ritz-Carlton Hotel in Philadelphia during the National Metal Congress. All gas men who attend the National Metal Congress are cordially invited to this informal get-together with the editors of the metals trades magazines. Oliver Johnson, manager, market research, *Iron Age,* will be the guest speaker.

A.G.A. will also sponsor a Combined Industrial Gas Exhibit at the Metal Show in Convention Hall.

Parsons to Be Honored As Ten-Year Secretary

Ten years of service as secretary-treasurer of the Los Angeles Chapter of the American Society for Metals will be recognized when William J. Parsons attends the National Metal Congress and Exposition in Philadelphia. Mr. Parsons will be an honored guest of the society on this occasion.

W. J. Parsons

Born in England, Bill Parsons settled in San Francisco in 1922, where, as an erector, he supervised the installation of heavy equipment. In 1929 he entered the field of industrial furnaces as a salesman for James H. Knapp Co. in Los Angeles, and in 1936 joined the Pacific Scientific Co. He is still with the latter company as division sales manager of the industrial department for the Pacific Coast and also a member of the firm.

Battelle Has Alumni Luncheon

A Battelle alumni luncheon has been scheduled as one of the extra-curricular activties during the National Metal Congress and Exposition in Philadelphia. The luncheon will be held on Tuesday noon, Oct. 26, at the Benjamin Franklin Hotel. All former staff members of the Institute are invited to attend. Further information may be had from R. O. Stith, Battelle Memorial Institute, Columbus 1, Ohio.

Honors Bestowed At A.S.M. Banquet

Honors and kudos will be bestowed upon prominent personalities in the metal industries on Thursday evening, Oct. 28, when A.S.M. members gather again for their annual banquet during the National Metal Congress in Philadelphia.

At that time Francis C. Frary, director of research for Aluminum Co. of America, will be awarded the A.S.M. Gold Medal, and Willard Dow, president of Dow Chemical Co., will be given the A.S.M. Medal for Advancement of Research. The Henry Marion Howe Medal for the best paper appearing in the Society's Transactions will also be presented; recipient of this honor has not yet been announced. No award of the Sauveur Achievement Medal will be made this year.

The "Salute to Alloy Steel", theme of this year's Metal Congress, will come in for its share of attention at the banquet, when the names of the recipients of the Distinguished Service Awards for alloy steel development will be read (see page 4 for details of awards).

A.S.M. Retiring President Francis B. Foley, superintendent of research, Midvale Co., will preside at the banquet and will present the Past President's Medal to Alfred L. Boegehold, head of the metallurgy department, research laboratories division, General Motors Corp., and president of the American Society for Metals in 1946-47.

The banquet will be held in the ballroom of the Benjamin Franklin Hotel in Philadelphia, and will be addressed by a prominent speaker on a subject of general interest and importance. Advance reservations should be mailed to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Chapter Chairmen to Meet

The annual A.S.M. Chapter Chairmen's Breakfast will be held Wednesday morning, Oct. 27, at 8:00 a.m. at the Benjamin Franklin Hotel, Philadelphia, as a feature of the National Metal Congress.

The board of trustees will attend the Chairmen's Breakfast and president Foley will preside. Topics of interest pertaining to the functioning of chapters will be presented for open discussion.

Robert Franklin Mehl. *Journal of the Iron and Steel Institute*, v. 159, June 1948, p. 113-129.

In considering the kinetics of the reactions responsible for this decomposition (formation of ferrite, carbide, pearlite, and bainite), both rate and morphology were studied by isothermal reaction. Isothermal transformation diagrams for various steels; rate of nucleation and growth as a function of temperature; diffusion coefficient of carbon in austenite as a function of carbon concentration; extrapolation of GS and ES curves for Fe-C alloys; interlamellar spacing of pearlite as a function of undercooling; observed and calculated rates of growth of pearlite. 51 ref.

4b-48. A Study of the Hydrogen, Oxygen, and Nitrogen Contents of Foundry Pig-Iron. J. E. Hurst and R. V. Riley. *Journal of the Iron and Steel Institute*, v. 159, June 1948, p. 130-136.

Results of a survey in samples of foundry pig iron from a number of British sources. A comparison was also made between recently cast pig iron and samples cast 25 years previously, from the same manufacturer. The determinations were made by the vacuum-fusion method, and substantial differences in hydrogen, oxygen, and nitrogen contents were recorded for the various types. Compositions were determined by chemical and spectrographical analysis with special attention to residual or minor elements.

4b-49. Influence of Chromium on Graphitization of White Cast Iron. Gabriel Joly. *American Foundryman*, v. 14, July 1948, p. 60-64.

Official exchange paper of French Foundry Technical Association presents results of experimental work performed in order to determine the annealing cycles necessary to obtain, for a series of Cr contents from 0.032 to 0.137%, an iron having ferritic-nodular graphitic structure.

4b-50. Dispersion Hardening of High-Alloy Austenite as Factor of Its Heat Resistance. (In Russian.) A. M. Borzdyka. *Izvestiya Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk* (Bulletin of the Academy of Sciences of the U.S.S.R., Section of Chemical Sciences.), no. 2, March-April 1948, p. 153-160.

Processes of dispersion solidification of metallic gamma solid solutions of the systems Fe-Cr-Ni and Fe-Cr-Mn in connection with their mechanical strength at high temperatures. Principles of rational utilization of such processes during the practical application of austenitic alloys under conditions of creep at high temperatures. 10 ref.

4b-51. Current Theories of the Hardening of Steel—50 Years Later. J. B. Austin. *Metal Progress*, v. 54, Aug. 1948, p. 201-208.

Brings up to date the ever-current topic of the theory of the hardening of steel.

4b-52. Effects of Boron Additions on Malleabilization of White Cast Iron. J. E. Micksch, H. A. Fabert, Jr., and G. M. Cover. *American Foundryman*, v. 14, Aug. 1948, p. 30-37.

Micrographic data on the additions of boron in minute quantities to counteract the stabilizing effect of chromium on the malleabilization of white cast iron. Phase diagrams and results of investigation. 13 ref.

4b-53. The Application of Columbium (Nb) to the Continued Toughness of Chrome-Molybdenum Steels at 1022°F. (In Russian.) Ya. S. Gintsburg, K. A. Lanskaya, and A. V. Ctanyukovich. *Kotloturbostroenie*, (Boiler and Turbine Manufacture), Jan.-Feb. 1948, p. 17-19.

Application of columbium to the resistance of various chromium-molybdenum steels containing 2 to 7% Cr and 0.5% Mo. Toughness of the given steels at 1022° F.

4b-54. Nodular Cast Irons, Their Production and Properties. H. Morrogh and J. W. Grant. *Foundry Trade Journal*, v. 85, July 8, 1948, p. 27-34; July 15, 1948, p. 51-57; July 22, 1948, p. 81-86.

Mechanical properties of typical nodular irons and the commercial production of the material. (To be continued.)

4b-55. Steels for Forging. Part III. The Nickel-Chrome Alloys. Lester F. Spencer. *Steel Processing*, v. 34, Aug. 1948, p. 427-431.

Relation of composition to forging with particular reference to "flaking". Includes data on heating cycles for specific grades of Ni-Cr steels, mechanical properties of Cr-V steel forgings, and properties of some forged Ni-Mo and Ni-Cr-Mo steels. (To be continued.)

4c—Nonferrous

4c-47. Influence of Manganese on the Polymorphous Transformation in Iron-Chromium Alloys. (In Russian.) A. T. Grigor'ev and D. L. Kudryavtsev. *Izvestiya Akademii Nauk SSSR. Otdelenie Khimicheskikh Nauk* (Bulletin of the Academy of Sciences of the U.S.S.R., Section of Chemical Sciences.), no. 2, March-April 1948, p. 165-173.

Two cross sections of the system Fe-Cr-Mn with a constant manganese content of 0.6% and 1.4% respectively and with a variable content of Cr up to 22%. 20 ref.

4c-48. Note on Some Theoretical Discussions of Palladium-Hydrogen and Cognate Systems. Donald P. Smith. *Philosophical Magazine*, v. 39, June 1948, p. 477-481.

Surveys various discussions which seek to account for the hystereses and other characteristics of the above system upon thermodynamical or statistical-mechanical grounds. 27 ref.

4c-49. Das Dreistoffsystem Gold-Kupfer-Nickel II. (The Ternary System of Gold-Copper-Nickel II.) Ernst Raub and Annemarie Engel. *Metallforschung*, v. 2, May 1947, p. 147-158.

X-ray examinations of structure changes of alloys at the corner sections of the Au-Cu-Ni and AuCu$_3$-Ni systems caused by annealing at 300° to 400° C. Effects of cold working before annealing operation on the segregation and transformation reactions in these ternary alloys.

4c-50. Dichte- und Massänderungen kaltverformter Zinklegierungen. (Changes in Density and Dimensions of Cold Worked Zinc Alloys.) Karl Lohberg. *Metallforschung*, v. 2, June 1947, p. 169-172.

The change in density caused by cold working is explained as the result of translation and mechanical twinning. The decrease in the length of the bars when stored at 95° C. is related to the variation in density and possibly to the recrystalization of the worked material. 13 ref.

4c-51. Uber den Gefugeaufblau von Sinterhartmetallen, insbesondere von Wolframkarbid-Titankarbid-Kobalt-Legierungen. (The Structure of Sinter-Hard Metals, Especially Alloys of Tungsten Carbide, Titanium Carbide and Cobalt.) Richard Kieffer. *Metallforschung*, v. 2, July-Aug. 1947, 236-238.

The structures of these alloys containing different amounts of binder contents and the effect of long-time sintering on the structures of WC-Co and WC-TiC-Co alloys with different carbide contents. A new etching process is given to identify the different carbide phases.

4d—Light Metals

4d-22. The Lattice Spacings of Solid Solutions of Different Elements in Aluminum. H. J. Axon and W. Hume-Rothery. *Proceedings of the Royal Society*, ser. A, v. 193, April 22, 1948, p. 1-24.

Measurements were made of the lattice spacings of solid solutions of Li, Mg, Si, Cu, Zn, Ge, and Ag in Al. Results are interpreted in terms of atomic structure. 26 ref.

4d-23. On the Inhomogeneity of Plastic Deformation in the Crystals of an Aggregate. W. Boas and M. E. Hargreaves. *Proceedings of the Royal Society*, ser. A, v. 193, April 22, 1948, p. 89-97.

The variation of plastic deformation in aluminum specimens consisting of large crystals was determined by measuring elongation and hardness at various points after tensile deformation. The deformation varied from grain to grain, and also within each grain deformation near the boundary was greater or smaller than at the center according to whether the neighbor was more or less deformed—there is not necessarily inhibition of slip near grain boundaries. Results are of importance for calculation of the stress-strain curve of aggregates from those of single crystals. It is suggested that a mechanism other than slip operates near the grain boundaries during deformation, and even within the crystals during large extensions.

4d-24. The Energies of Electrons in Aluminium. Z. Matyas. *Philosophical Magazine*, v. 39, June 1948, p. 429-449.

How it is possible to construct the probable band structure of aluminum by means of the general Bloch method. Interpretations of some principal features of soft X-ray emission spectra of aluminum. 11 ref.

For additional annotations indexed in other sections, see:

3b-97-118-124; 3c-61; 6a-88-89; 6d-27; 8-183; 18a-22; 24a-193.

5a—General

5a-45. The Sintering of Metal Powders. Robert Talmage. *Industrial Gas*, v. 27, July 1948, p. 11-12, 24-27.

General explanation and methods for copper, brass, and iron-powder sintering.

(Turn to page 18)

American Society for Metals

Technical and Convention Program
Benjamin Franklin Hotel and Convention Hall
Oct. 25 through 29, 1948

Monday, Oct. 25

9:30 a. m.—Ballroom
Benjamin Franklin Hotel

HEAT TREATMENT

The Isothermal Decomposition of Martensite and Retained Austenite, by B. L. Averbach and Morris Cohen, Massachusetts Institute of Technology.

The Dimensional Stability of Steel. Part IV—Tool Steels, by B. S. Lement, B. L. Averbach and Morris Cohen, Mass. Inst. of Technology.

The Transformation and Retention of Austenite in S.A.E. 5140, 2340 and T 1340 Steels of Comparable Hardenability, by A. R. Troiano, University of Notre Dame.

The Microstructure of Low-Carbon Steel, by R. L. Rickett and F. C. Kristufek, United States Steel Corp.

2:00 p. m.—Ballroom
Convention Hall

HEAT TREATMENT

Influence of Ni and Mo on Isothermal Transformation of Austenite in Pure Fe-Ni-Mo Alloys Containing 0.55 Carbon, by D. A. Scott, W. M. Armstrong, and F. A. Forward, University of British Columbia.

The Transformation Characteristics of Ten Selected Nickel Steels, by J. P. Sheehan, Armour Research Foundation, C. A. Julien, Naval Research Laboratory, and A. R. Troiano, University of Notre Dame.

The Metallography and Heat Treatment of 8 to 10% Nickel Steel, by G. R. Brophy and A. J. Miller, International Nickel Co.

Predicting the Effect of Complex Tempering Cycles, by J. L. Waisman, Douglas Aircraft Co., and W. T. Snyder, Herff Jones Co.

Tuesday, Oct. 26

9:30 a. m.—Ballroom
Benjamin Franklin Hotel

STEEL INGOTS

Distribution of Nonmeatllic Inclusions in Some Killed Alloy Steel Ingots, by K. L. Fetters, Youngstown Sheet and Tube Co., M. M. Helzel and J. W. Spretnak, Carnegie Institute of Technology.

Some Factors Affecting Subsurface Defects in Large Forging Steel Ingots, by E. A. Loria, Mellon Institute, and H. D. Shephard, Kerchner, Marshall & Co.

Density Variations in Some Killed Steel Ingots, by C. F. Sawyer, Vanadium-Alloys Steel Co., and J. W. Spretnak, Carnegie Institute of Technology.

The Nature of Inclusions in Tensile Fractures of Forging Steels, by H. D. Shephard, Kerchner, Marshall & Co., and E. A. Loria, Mellon Institute of Industrial Research.

Tuesday, Oct. 26

9:30 a. m.—Betsy Ross Room
Benjamin Franklin Hotel

NONFERROUS ALLOYS

Fractographic Examination of Tungsten, by C. A. Zapffe and F. K. Landgraf, Baltimore.

The Effect of Orientation on Knoop Hardness of Single Crystals of Zinc and Silicon Ferrite, by F. W. Daniels and C. G. Dunn, General Electric Co.

The Effect of Single Addition Metals on the Recrystallization, Electrical Conductivity and Rupture Strength of Pure Aluminum, by R. H. Harrington, General Electric Co.

Forming and Heat Treatment of Corrugated Diaphragms, by R. I. Jaffee, E. I. Beidler and R. H. Ramsey, Battelle Memorial Institute.

12:00 m.—Franklin Room
Benjamin Franklin Hotel

CANADIAN LUNCHEON

2:00 p. m.—Ballroom
Convention Hall

MECHANICAL PROPERTIES

The Microstructure and Mechanical Properties of Cast Steels, by M. F. Hawkes and B. F. Brown, Carnegie Institute of Technology.

Effect of Vanadium on the Properties of Cast Carbon and Carbon-Molybdenum Steels, by N. A. Ziegler, W. L. Meinhart and J. R. Goldsmith, Crane Co.

Mechanical Properties, Including Fatigue, of Aircraft Alloys at Very Low Temperatures, by J. L. Zambrow and M. G. Fontana, Ohio State University.

Influence of Low Temperature on the Mechanical Properties of 18-8 Chromium-Nickel Steel, by D. J. McAdam, Jr., G. W. Geil and Frances Jane Cromwell, National Bureau of Standards.

2:00 p. m.—Room 304
Convention Hall

DISCUSSION MEETING ON CLASSIFICATION AND FILING OF METALLURGICAL LITERATURE

Wednesday, Oct. 27

8:00 a. m.—Betsy Ross Room
Benjamin Franklin Hotel

CHAPTER CHAIRMEN'S BREAKFAST

Wednesday, Oct. 27

10:00 a. m.—Ballroom
Benjamin Franklin Hotel

A. S. M. ANNUAL MEETING

Edward deMille Campbell Memorial Lecture, by Morris Cohen, Massachusetts Institute of Technology.

12:00 m.—Benjamin Franklin Hotel

COLLEGE ALUMNI LUNCHEONS

2:00 p. m.—Ballroom
Convention Hall

ENGINEERING PROPERTIES

Basic Reasons for Good Machinability of "Free Machining" Steels, by M. Eugene Merchant and N. Zlatin, Cincinnati Milling Machine Co.

An End Quenched Bar for Deep Hardening Steels, by Gerrit DeVries, U. S. Naval Proving Ground.

Transverse Mechanical Properties in Heat Treated Wrought Steel Products, by Cyril Wells and R. F. Mehl, Carnegie Institute of Technology.

Residual Stresses and Microstructure in Hollow Cylinders, by H. B. Wishart and R. K. Potter, Carnegie-Illinois Steel Corp.

Thursday, Oct. 28

9:30 a. m.—Ballroom
Convention Hall

STAINLESS STEELS

Resistance to Sensitization of Austenitic Chromium-Nickel Steels of 0.03 Max. Carbon Content, by W. O. Binder and C. M. Brown, Union Carbide and Carbon Research Laboratories, and Russell Franks, Electro Metallurgical Co.

Mechanism of the Rapid Oxidation of High-Temperature, High-Strength Alloys Containing Molybdenum, by W. C. Leslie and M. G. Fontana, Ohio State University.

Stabilization of Austenitic Stainless Steel, by Samuel J. Rosenberg and John H. Darr, National Bureau of Standards.

Delta Ferrite Formation and its Influence on the Formation of Sigma Phase in a Wrought Heat Resisting Steel, by John J. Gilman, Illinois Institute of Technology, Pun Kien Koh, Allegheny Ludlum Steel Corp., and Otto Zmeskal, Illinois Institute of Technology.

(Continued on page 19)

Make Your Hotel Reservations See Page 61

5a-46. Metallurgical Books. (Continued.) Sibyl E. Warren. *Metals Review,* v. 21, July 1948, p. 41-43.

Continues classified bibliography of metallurgical books published during 1936-1946. This installment lists those dealing with powder metallurgy and casting. (To be continued.)

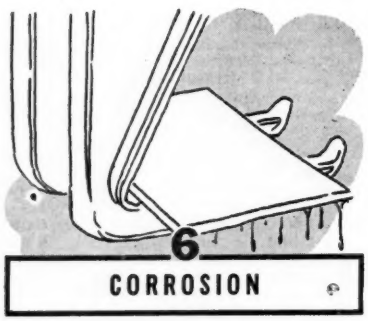
5a-47. Uber einige neue Verfahren der Pulvermetallurgie. (Several New Methods Used in Powder Metallurgy.) Gunter Wassermann. *Metallforschung,* v. 2, May 1947, p. 129-137.

The new methods are the production of sintered articles by sintering individual parts together, the drawing and rolling of tubes filled with powder, and the hot pressing of sinter cakes in a die.

5a-48. Powder Metallurgy Notes. J. Heuberger. *Metallurgia,* v. 38, July 1948, p. 169-171.

The production of components by the powder metallurgy method provides an alternative method of production which may be more economical in materials and labor costs than that usually adopted. The method is advantageous in some applications when high purity of the material is sought.

For additional annotations indexed in other sections, see:
11-205.



6a—General

6a-76. Metals for Use with Highly Corrosive Media. *Materials & Methods,* v. 28, July 1948, p. 87, 89.

Chemicals to which aluminum; brass; bronze; duriron; Hastelloys A, B and C; iron; lead; monel; nickel; phosphor bronze; stainless steels 303 and 316; ordinary steel; and tantalum are "impervious to" and "highly resistant to".

6a-77. Corrosion Can Be Controlled in Refrigeration Systems. Joseph I. Montel. *Refrigerating Engineering,* v. 56, July 1948, p. 35-38.

How it can be done by use of corrosion inhibitors.

6a-78. Corrosion by Molten Materials. Part II. (Concluded.) F. R. Morral. *Wire and Wire Products,* v. 23, July 1948, p. 571-579.

Data on corrosion in molten salts and in salt mixtures.

6a-79. Sulphuric Acid Versus Construction Materials. *Chemical Engineering,* v. 55, July 1948, p. 227-228, 230, 232, 234, 236.

Part III of a symposium in which typical materials of construction are evaluated for services involving sulphuric acid. High-Silicon Irons, Walter A. Luce; Silicones, J. A. McHard; Tantalum, Leonard R. Scribner; and Haveg, E. P. Mampe.

6a-80. A Method of Electrically Bonding High Resistance Pipe Couplings Without Excavation. H. S. Riddle and H. S. Harris, *Gas Age,* v. 102, July 8, 1948, p. 17-18, 56-57.

A remedial measure for protecting subsurface pipe-lines against electrolysis by flash-brazing copper wire to the pipe couplings from surface of the ground, utilizing an electric welding machine and making physical contact through auger-holes.

6a-81. Appliance Corrosion Under Attack. H. A. Pray, R. S. Peoples, and R. S. Dalrymple. *American Gas Association Monthly,* v. 30, July-Aug. 1948, p. 19-23, 59-60.

A.G.A.-sponsored project at Battelle Memorial Institute for development of apparatus and procedures to study conditions which exist in central gas-heating equipment.

6a-82. Electrochemical Study of the Mechanism of Metal Corrosion in Ethylene Glycol Solutions. (In Russian.) N. D. Tomashov and M. A. Timonova. *Zhurnal Fizicheskoi Khimii* (Journal of Physical Chemistry), v. 22, Feb. 1948, p. 221-231.

Anodic and cathodic polarization curves for Cu, Fe, Al in contact with the above solution. From these, conclusions are drawn concerning the mechanisms involved and the relationship of certain controlling factors to the corrosion which takes place.

6a-83. Le mécanisme de la protection cathodique. (The Mechanism of Cathodic Protection.) R. B. Mears. *Métaux & Corrosion,* v. 23, March-April 1948, p. 50-56.

Mechanism of cathodic protection; its criteria and applications. 13 ref.

6a-84. La technique de la protection cathodique. (The Technique of Cathodic Protection.) R. de Brouwer. *Métaux & Corrosion,* v. 23, March-April 1948, p. 57-70.

The different systems employed for cathodic protection of pipe lines.

6a-85. The Work of the Chemical Research Laboratory. *Engineering,* v. 166, July 9, 1948, p. 29.

Work of above laboratory of the British Government's Dept. of Scientific and Industrial Research. It is divided into five main branches including corrosion of metals.

6a-86. Metal Oxide Films at Elevated Temperatures. J. W. Hickman. *Iron Age,* v. 162, Aug. 12, 1948, p. 90-94. Aug. 19, 1948, p. 90-94.

Investigation of the structures of thin oxide films in various metals and alloys, conducted for the purpose of evaluating surface stability characteristics. Principles associated with the study of surface structures and the experimental procedure followed in the course of this reflection electron diffraction study.

6a-87. Marine Corrosion Testing. Frank N. Speller. *Blast Furnace and Steel Plant,* v. 36, Aug. 1948, p. 950-953.

Review of duscussions of marine corrosion testing.

6a-88. Die Ursache der Spannungskorrosionsempfindlichkeit homogener Legierungen. (The Cause of Stress Corrosion Sensitivity of Homogeneous Alloys.) Ludwig Graf. *Metallforschung,* v. 2, July-Aug. 1947, p. 193-207.

Effect of the degree of purity of deoxidizing soluble additions, the gravity ratio, the chemical and electro-chemical effect on stress corrosion. 34 ref.

6a-89. Zur Spannungskorrosion heterogener Legierungen. (Stress Corrosion of Heterogeneous Alloys.) Ludwig Graf. *Metallforschung,* v. 2, July-Aug. 1947, p. 207-212.

Relationship of causes of stress corrosion in homogeneous and heterogeneous alloys, difference between grain boundary and structural heterogeneity, and the reactions in different aluminum, copper, and gold alloys. 13 ref.

6a-90. Corrosion Studies. Albert L. Kimmel. *Florida Engineering and Industrial Experiment Station College of Engineering,* University of Florida, (Gainesville), Bulletin no. 17, Sept. 1947, 42 pages.

Mechanical, chemical, and electrical methods for mitigation of corrosion. Engineering data relative to the installation of cathodic protection systems in water tanks.

6a-91. Fluorine Corrosion: (A) High-Temperature Attack on Metals by Fluorine and Hydrogen Fluoride; and (B) Behavior of Insulated Steel Parts in Fluorine Cells. W. R. Myers and W. B. DeLong. *U. S. Atomic Energy Commission,* MDDC-1465, 1947, 19 pages.

The corrosion of a number of metals and alloys by fluorine at elevated temperatures. The data were obtained by exposing samples to fluorine in an electrically heated furnace equipped with a monel tube. Results of a study of the attack on a number of metals and alloys by HF and by HF-steam in equimolecular quantities. Results of an investigation on the behavior of steel parts anodically charged in an electrolyte of $KHF_2 \cdot HF$ at 90° C.

6a-92. Progress Being Made in Fight Against Corrosion Losses of Metals. William Mann. *Materials & Methods,* v. 28, Aug. 1948, p. 51-55.

Recent advances in processes and methods in combating corrosion.

6a-93. Corrosion Prevention in Processing Sour Crudes. E. Q. Camp. *Corrosion,* v. 4, Aug. 1948, p. 371-398.

Problems encountered. Flow diagram for processing sour crudes. Corrosion aspects of various process units. 29 ref.

6a-94. Corrosion in Vertical Turbine Pumps. T. E. Larson, *Corrosion,* v. 4, Aug. 1948, p. 412-420.

Various types of corrosion in water pumping systems.

6b—Ferrous

6b-85. Cathodic Protection of Steel Water Tanks. Peter E. Pallo. *Journal, American Water Works Association,* v. 40, July 1948, p. 701-711.

An investigation to determine degree of protection afforded by aluminum anodes with an applied external potential; magnesium anodes; and the electrodeless circuit with an applied external potential.

6b-86. Cathodic Protection of Under-Ground Structures. *Gas Age,* v. 102, July 8, 1948, p. 25, 57-58.

Tests made to determine value of attaching zinc cylinders to steel specimens as a means of preventing underground electrolysis or corrosion.

6b-87. Effects of Hydrogen in the Corrosion of Steel. *Iron Age,* v. 162, July 29, 1948, p. 78. Condensed from paper by M. H. Bartz and C. E. Rawlins.

Previously abstracted from *Corrosion,* v. 4, May 1948, p. 187-206. See Item 6b-45, 1948.

6b-88. Protection des pipe-lines de la régie autonome des pétroles contre les corrosions électrolytiques. (Protection of the Pipelines of the "Autonomous Oil Administration" Against Corrosion.) Y. Boyer. *Metaux & Corrosion,* v. 23, March-April 1948, p. 79-88.

Methods of protection used by the French Government oil monopoly, including both cathodic protection and coatings.

6b-89. Remarques a propos de corrosions électrolytiques constatées sur un

(Turn to page 20)

A. S. M. PROGRAM *(Cont.)*

Thursday, Oct. 28

9:30 a. m.—Room 300 Convention Hall

NONFERROUS ALLOYS

The Indium-Bismuth Phase Diagram, by E. A. Peretti and S. C. Carapella, Jr., University of Notre Dame.

Manganese-Zinc Phase Diagram From 0 to 50% Zinc, by E. V. Potter, U. S. Navy Electronics Laboratory, and R. W. Huber, Bureau of Mines.

Dilatometric Effects of Hardening and Recrystallization in the 60 Copper, 20 Nickel, 20 Manganese Alloy, by C. H. Samans, C. C. Brayton, H. L. Drake and L. Litchfield, American Optical Co.

Beta Laminations in Cartridge Brass, by Ralph L. Dowdell, University of Minnesota, Charles A. Nagler, Wayne University, Morris E. Fine, Bell Telephone Laboratories, Harold P. Klug, Mellon Institute of Industrial Research, and Gust Bitsianes, University of Minnesota.

Thursday, Oct. 28

2:00 p. m.—Ballroom Convention Hall

HIGH TEMPERATURE ALLOYS

Aging in Gas Turbine Type Alloys, by Nicholas J. Grant and J. R. Lane, Massachusetts Institute of Technology.

Nickel-Base Alloys for High-Temperature Applications, by A. G. Guy, North Carolina State College.

Short-Time High-Temperature Deformation Characteristics of Several Sheet Alloys, by James Miller and Glen Guarnieri, Cornell Aeronautical Laboratory.

Stability of Steels at Elevated Temperatures, by A. B. Wilder and J. O. Light, National Tube Co.

7:00 p. m.—Ballroom Benjamin Franklin Hotel

A. S. M. ANNUAL BANQUET

Friday, Oct. 29

9:30 a. m.—Ballroom Convention Hall

PHYSICS OF METALS

Application of the Theory of Diffusion to the Formation of Alloys in Powder Metallurgy, by Pol Duwez and Charles B. Jordan, Cailfornia Institute of Technology.

Thermodynamics in the Decarburization of Steel With Mill Scale, by W. A. Pennington, Carrier Corp.

Cause and Cure of Inverse Chill and Hard Spots in Cast Iron, by C. A. Zapffe and R. L. Phebus, Baltimore.

Some Wetting Properties of Metal Powders, by Bernard Kopelman and C. C. Gregg, Sylvania Electric Products, Inc.

2:00 p. m.—Ballroom Convention Hall

TESTING

A Versatile Vacuum-Fusion Apparatus, by Manley W. Mallett, Battelle Memorial Institute.

The Abrasion Resistance of Metals, by R. D. Haworth, Jr., Armour Research Foundation.

Solder Flow Tester for Tin Plate, by J. J. Sperotto, American Can Co.

Nature and Detection of Grinding Burn in Steel, by L. P. Tarasov and C. O. Lundberg, Norton Co.

Educational Lecture Series

Sponsored by American Society for Metals

Convention Hall, Philadelphia

Oct. 25 through 28, 1948

Properties of Metals in Materials Engineering

Monday, Oct. 25

4:15 p. m.—Room 300

Introduction, by R. L. Templin, Aluminum Co. of America.

Fundamental Concepts, by M. Gensamer, Carnegie-Illinois Steel Corp.

8:00 p. m.—Room 300

Properties of Metals Under Direct or Non-Reversed Loading, by John R. Low, Jr., General Electric Co.

Application of Fatigue Data to Machine Design, by R. E. Peterson, Westinghouse Research Laboratories.

Tuesday, Oct. 26

4:15 p. m.—Room 300

Determination of the State of Stress (Instrumentation), by W. M. Murray, Massachusetts Institute of Technology.

Analysis of Stress in Aircraft Engines, by W. T. Bean, Jr., Continental Aviation Corp.

7:30 p. m.—Room 300

Testing to Specific Deflections (Buckling), by E. C. Hartmann, Aluminum Research Laboratories.

Design for Energy Absorption, by Wendell P. Roop, Swarthmore College.

Grain Growth in Industrial Metallurgy

Tuesday, Oct. 26

8:30 p. m.—Ballroom

Fundamentals of Grain Growth and Recrystallization, by J. E. Burke, Institute for the Study of Metals, University of Chicago.

Wednesday, Oct. 27

4:15 p. m.—Room 300

Recrystallization in Iron and Iron Alloys With Suitable Reference to Practice, by R. L. Kenyon, Armco Steel Corp.

Wednesday, Oct. 27

8:00 p. m.—Room 300

Working and Grain Control in the Copper-Base Industry, by H. L. Burghoff, Chase Brass & Copper Co.

Thursday, Oct. 28

4:15 p. m.—Room 300

Grain Control in the Light Metal Industry, by J. T. Hobbs, Aluminum Research Laboratories.

Metallurgy and Magnetism

By J. K. Stanley

Magnetic Department Westinghouse Electric Corp.

Mon., Tues. and Wed. Oct. 25, 26 and 27

5:15 p. m.—Ballroom

A series of three lectures on **Magnetic Theory and Definitions; Metallurgical Factors Affecting Magnetic Quality; Types and Uses of Ferromagnetic Materials; Magnetic Analysis as a Metallurgical Tool.**

All of the papers to be presented before the American Society for Metals technical sessions are being abstracted in the current issues of *Metal Progress*. Approximately the first half of the papers were abstracted in the September issue, and the remaining half will appear in the October issue.

pipe-line de la régie autonome des pétroles. (Remarks Concerning the Electrolytic Corrosion Observed on a Pipe Line of the "Autonomous Oil Administration".) J. P. Verrien. *Metaux & Corrosion,* v. 23, March-April 1948, p. 89-97.

Results of investigation indicate that electrolytic corrosion does not take place spontaneously. Two phases were observed: first, a preliminary phase which may be of long duration during which no corrosion takes place; and the corrosion period, generally much shorter.

6b-90. Protection galvanique des structures métalliques enterrées ou immergées par les anodes en magnesium. (Galvanic Protection of Underground or Underwater Metallic Structures by Magnesium Anodes.) Bernard J. C. Raclot. *Metaux & Corrosion,* v. 23, March-April 1948, p. 98-102.

Especially the technique of application to underground pipe lines. Charts and diagrams.

6b-91. An Investigation of Boiler-Drum Steel After Forty Years of Service. H. S. Blumberg and G. V. Smith. *Transactions of the American Society of Mechanical Engineers,* v. 70, April 1948, p. 185-198; discussion, p. 198-200.

Examination of materials from seven riveted boiler drums removed from service after 40 years' operation at a temperature and pressure of 388° F. and 200 psi. respectively, revealed no evidence of deterioration in properties of the steel from which they were made.

6b-92. The Statistics of Boiler Embrittlement. C. D. Weir. *Transactions of the American Society of Mechanical Engineers,* v. 70, April 1948, p. 253-256.

The methods of mathematical statistics were applied to the results of experiments carried out with Schroeder detector units. It was shown that differences in composition of the feedwaters with regard to hydroxide, chloride, silica, oxide, and phosphate do not influence materially the cracking susceptibility. Sulphate was found to stimulate cracking somewhat when present at concentrations in the region 200 to 600 p.p.m. Other conclusions.

6b-93. Bacteria That Destroy Concrete and Steel. K. R. Butlin. *Discovery,* v. 9, May 1948, p. 151-155.

Sulphur cycle and how sulphate-reducing bacteria contribute to corrosion of materials. Methods of protection. Electron micrographs of different species of such bacteria.

6b-94. Evolution of Hydrogen From Ferrous Hydroxide. U. R. Evans and J. N. Wanklyn. *Nature,* v. 162, July 3, 1948, p. 27-28.

Literature and certain experiments on the above, which is of importance in connection with the corrosion of iron by pure oxygen-free water since ferrous hydroxide may be formed by reaction of iron and water, with evolution of hydrogen.

6b-95. Climatic Effects on the Corrosion of Steel. J. Dearden *Journal of the Iron and Steel Institute,* v. 159, July 1948, p. 241-246.

Observations on the effects of the weather prevailing at the start of exposure, the annual shedding of rust, the explanation when this cannot occur, and the sulphur content of rust formed under various conditions. 11 ref.

6b-96. Recent Developments in Cathodic Protection of Pipe Lines. N. P. Peifer and F. E. Costanzo. *Gas Age,* v. 102, Aug. 5, 1948, p. 21-23.

Two refinements in cathodic corrosion protection of bare underground steel pipe lines. One depends on a refinement of the common method of determining the need for protection and on calculations of current densities required for protection. The other is the use of expendable ribbon-type magnesium anode paralleling the pipe at varying distances computed from predetermined galvanic currents.

6c—Nonferrous

6c-26. Tough Materials for Tough Service. *Inco Magazine* v. 22, Summer 1948, p. 8.

70-30 Cu-Ni alloy developed for condenser tube and other corrosion resistant uses shows negligible attack on welded and unwelded samples after 11 years in salt water.

6c-27. Effect of Temperature on the Ferric Chloride Etching of Copper. Luther E. Vaaler. *Photoengravers Bulletin,* v. 37, July 1948, p. 45-47.

Experimental data on effects of temperature of iron chloride on copper etching of line work, and effects of temperature of iron chloride on copper etching of halftones (120-line).

6c-28. Notes on the Prevention of White Powder Corrosion of Cadmium Plate. L. H. Seabright and J. Trezak. *Plating,* v. 35, July 1948, p. 715-718.

Cause and prevention of corrosion of Cd-plated iron parts in electromagnetic assemblies were investigated. The corrosion product was found to be a water-soluble organic material such as cadmium formate, evidently formed by reaction with volatile organic acids resulting from decomposition of impregnated fabric or paper insulation, liquid seals, or paints containing vegetable oils. Corrosion of 17 combinations of Cd, Cd-alloy, or other metal plates with different insulating materials. Absorption of fumes by activated carbon; use of Cu-Ni, Cu-Ni-Cr, Cd-Ni, or Cd-Ni-Cr; or of Cd with cellulose acetate prevent corrosion.

6c-29. Copper Underground: Its Resistance to Soil Corrosion. *Copper Development Association, C.D.A. Publication* No. 40, 1948, 50 pages.

Laboratory studies and results of field tests on copper, lead, steel, and cast iron with particular reference to use of copper pipes for underground gas and water services. 35 ref.

6d—Light Metals

6d-20. Acetic + Anhydride = Corroded Aluminum. *Chemical Engineering,* v. 55, July 1948, p. 256. Based on paper by G. Benson and R. M. Kitchen.

Acetic acid which contains traces of water is not corrosive to Al. Addition of acetic anhydride to the acid is the only way in which anhydrous conditions are likely to be produced. Hence this should be avoided when using Al containers.

6d-21. Formation of the Natural Oxide Film on Aluminum. Fred Keller and Junius D. Edwards. *Metal Progress,* v. 54, July 1948, p. 35-41.

Recent work on measurement of the rate of formation of the film at ordinary and at elevated temperatures.

6d-22. Le procédé framalite protection contre la corrosion et sous-couche d' accrochage des peintures. (The "Framalite" Process for Protection Against Corrosion and Subsurface Attack of Coated Objects.) Jean Frasch. *Revue de L'Aluminium,* v. 25, May 1948, p. 176-180.

Development and properties of a special composition known as "Framalite" for passivation of aluminum for protection against corrosion and for treatment prior to painting. The material consists of a gelatine emulsion of bichromate containing zinc carbonate for stabilization against effects of moisture. Methods of application and protection afforded to test panels.

6d-23. Study of the Aluminum Oxide Layer on Aluminum Anodes of Electrolytic Condensers. (In French.) E. Brandenberger and R. J. Häfeli. *Helvetica Chimica Acta,* v. 31, June 15, 1948, p. 1168-1172.

The method of Treadwell and collaborators (dissolving the base metal by means of dry HCl gas in anhydrous ether) was used to separate the oxide film. The latter was examined using radiographic technique to determine effect of voltage on structure of the oxide obtained on electrolysis. Phases formed at low, medium, and high voltages.

6d-24. Corrosion-Resistant Aluminum-Magnesium Alloys. P. Brenner and W. Roth. *Engineering,* v. 166, July 9, 1948, p. 44-47. A condensation.

Results of investigation made in order to determine the most suitable heat treatment for Al-Mg alloys containing 5 to 9% Mg and the effect of some of the most promising additions of small amounts of other metals in combination with the heat treatment.

6d-25. Composition and Properties of the Natural Oxide Film on Aluminum. Fred Keller and Junius D. Edwards. *Metal Progress,* v. 54, Aug. 1948, p. 195-200.

Films that form naturally on aluminum are undoubtedly closely related to the unusual corrosion and weathering resistance of the metal and its alloys. It presents an effective barrier to oxygen and water, and to many chemical solutions.

6d-26. Uber eine hochaluminiumhaltige Zinklegierung III. Wasserdampfkorrosion von Knetlegierungen. (High-Aluminum Zinc Alloys. III. Water Vapor Corrosion of Malleable Alloys.) Erich Gebhardt. *Metallforschung,* v. 2, July-Aug. 1947, p. 225-230.

Results of corrosion tests with water vapor at 95° C. Complete experimental data.

6d-27. Beiträge zur Frage der Wasserdampfkorrosion aluminiumhaltiger Zinklegierungen. IV. Uber den Einfluss von Blei. (Water Vapor Corrosion of Aluminum Containing Zinc Alloys. IV. The Effect of Lead.). Karl Löhberg. *Metallforschung,* v. 2, July-Aug. 1947, p. 230-232.

The distribution of lead in a eutectic Zn-Al alloy is determined by adding a mixture of lead and its radioactive isotope, thorium B. Corrosion tests prove that water-vapor corrosion tends to start at the lead aggregates.

6d-28. Notiz uber das Reaktionsvermögen von Wasserdampf und Wasserstoffsuperoxyd mit Leichtmetallen bei höheren Temperaturen. (The Reactivity of H_2O and H_2O_2 on Light Metals at Elevated Temperature.) Oswald Kubaschewski and Hans Ebert. *Metallforschung,* v. 2, July-Aug. 1947, p. 232-235.

Experiments on Mg, Al, Mg-Al, and Mg-Ca alloys. Test results.

6d-29. Corrosion of Metals With Oxygen Depolarization. *Light Metals,* v. 11, July 1948, p. 388-396.

Peculiarities in the corrosion-mechanism of aluminum and its alloys. (To be concluded.)

For additional annotations indexed in other sections, see: 24a-193; 27a-117.

American Welding Society

Twenty-Ninth Annual Meeting
Bellevue-Stratford Hotel, Philadelphia
Week of Oct. 24, 1948

Sunday, Oct. 24

5-7:00 p.m.—Burgundy Room

PRESIDENT'S RECEPTION

Monday, Oct. 25

9:30 a. m.—South Garden

SHIP DESIGN

Chairman—H. W. Pierce
New York Shipbuilding Corp.

Cochairman—R. L. Deily
Bethlehem Steel Co.

New Factors to Be Considered in the Design and Welding of Ships, by Milton Forman, Battelle Memorial Institute.

Riveted vs. Welded Structure, by E. M. MacCutcheon, David Taylor Model Basin, U. S. N.

Repair of Welded Ships, by L. E. Bledsoe, Newport News Shipbuilding & Drydock Co.

Evaluation of Effects of Residual Stresses, by T. W. Greene, Linde Air Products Co.

9:30 a. m. North Garden

RAILROAD

Chairman—J. W. Sheffer
American Car & Foundry Co.

Cochairman—A. J. Raymo
Baldwin Locomotive Works

Submerged-Arc Welding of Box and Hopper Cars, by E. A. Watson, American Car & Foundry Co.

Welding the Modern Diesel Locomotive, by H. S. Swan, American Locomotive Co.

General Welding Practices in Locomotive and Car Shops, by J. Michne, New York Central System.

9:30 a. m.—Rose Garden

STORAGE TANKS, PRESSURE VESSELS AND PIPING

Chairman—A. C. Weigel
Combustion Engineering Co.

Cochairman—E. B. Stolle
Midwest Piping & Supply Co.

Field Erected Storage Tanks of Aluminum, by Fred L. Plummer, Hammond Iron Works.

Sampling of Welds by Trepanning and Allied Methods, by R. B. Lincoln, Pittsburgh Testing Laboratory.

Pipe Welding, by John H. Zink, Heat & Power Corp.

The Effect of Fabrication Processes on Steels Used in Pressure Vessels, by C. J. Osborn, A. F. Scotchbrook, R. D. Stout and B. G. Johnston, Lehigh University.

4:30 p. m.—Convention Hall

EDUCATIONAL LECTURE

Chairman—G. E. Doan
Lehigh University

The Metallurgy of Arc Welds in Steel, by R. D. Stout, Lehigh University.

Monday, Oct. 25

8:00 p. m.—Rose Garden

AWARDS OF PRIZES AND MEDALS

Chairman—H. O. Hill
President, American Welding Society

Cochairman—E. V. David
Chairman, Convention Committee

ADAMS LECTURE

The Metallurgy of Covered Electrode Weld Metal, by G. E. Claussen, Reid-Avery Co.

Tuesday, Oct. 26

9:30 a. m.—South Garden

SYMPOSIUM ON SHIP STRUCTURE RESEARCH

Chairman—Capt. L. V. Honsinger, U.S.N.
Ship Structures Committee

Cochairman—J. Lyell Wilson
American Bureau of Shipping

Explosion Tests, by G. S. Mikhalapov, Air Reduction Sales Co.

Fracture Characteristics of Ship Plate in Certain Small Scale Tests, by E. P. Klier and F. C. Wagner, Pennsylvania State College, and M. Gensamer, Carnegie-Illinois Steel Corp.

Axial Tension Impact Tests of Structural Steel, by W. H. Bruckner and N. M. Newmark, University of Illinois.

9:30 a. m.—North Garden

RAILROAD

Chairman—A. G. Oehler
Railway Mechanical Engineer

Cochairman—L. E. Grant
Chicago, Milwaukee, St. Paul & Pacific R. R. Co.

Diesel Locomotive Welding, by R. L. Rex, Air Reduction Sales Co.

Submerged-Melt and Inert-Gas Shielded Electric Welding Applied to Railroad Cars, by C. R. Strutz, Oxweld Railroad Service Co.

Welding Practice in Welding A.I.S.I. Specification 430 (18% Chromium Steel) in Locomotive Fire Box Applications, by Howard L. Miller, Republic Steel Corp.

Tuesday, Oct. 26

9:30 a. m.—Rose Garden

HIGH ALLOYS; NON-FERROUS

Chairman—O. B. J. Fraser
International Nickel Co.

Cochairman—R. H. Aborn
United States Steel Corp.

The Effect of Weld Metal Composition on the Strength and Ductility of 15% Cr, 35% Ni Welds, by David Rozet, Hallock C. Campbell and R. David Thomas, Jr., Arcos Corp.

Use of Alloy and Welding in High-Temperature Service in Oil and Gas Processing, by M. E. Holmberg, Phillips Petroleum Co.

Stress-Corrosion in Naval Brass, by Bela Ronay, U. S. Navy Engineering Experiment Station.

Effect of Residual Compression on the Fatigue of Notched Aluminum Alloys, by D. Rosenthal, G. Sines, and G. Zizicas, University of California.

2:00 p. m.—South Garden

SYMPOSIUM ON SHIP STRUCTURE RESEARCH

Chairman—R. D. Schmidtman
Commander, U. S. Coast Guard

Cochairman—Finn Jonassen
National Research Council

The Development of Weldable High-Strength Steels, by C. E. Sims and H. M. Banta, Battelle Memorial Institute.

Effects of Geometry and Welding on the Transition Temperatures of High Yield Strength Structural Steels, by A. Boodberg and Earl R. Parker, University of California.

The Evaluation of Notch Sensitivity Characteristics of Steel by the Tear Test Method and Its Application to Quality Control of Ship Plate, by Noah A. Kahn and Emil A. Imbembo, New York Navy Yard.

2:00 p. m.—North Garden

BRAZING AND METALLIZING

Chairman—J. R. Wirt
Delco-Remy Division G. M. C.

Cochairman—G. W. Oxley
Standard Oil Development Co.

Low-Temperature Silver Alloy Brazing Copper-Beryllium Alloys, by A. M. Setapen and W. D. Warren, Handy & Harman.

Metallizing as a Production Process, by Knowles B. Smith, Dix Engineering Co.

(Continued on page 23)

See page 61 for Metal Congress Hotel Reservation Form Mail Yours Now!

7 CLEANING and FINISHING

7a—General

7a-165. Protective and Decorative Finishing. L. M. Towne. *Industrial Gas,* v. 27, July 1948, p. 5-7, 22-23.

Procedures and equipment of custom finisher.

7a-166. Blast Cleaning by Grit Conveyer Suction. *Western Metals,* v. 6, July 1948, p. 22-23.

Cleaning systems known as "Vacu-Blasters", in which abrasive grit is moved by suction. Various applications.

7a-167. One Coat Hammered Finishes. Johnny Nager. *Industrial Finishing,* v. 24, July 1948, p. 50, 52.

Some practical suggestions about decorative one-coat hammered finishes, baking and air-drying, correct spraying technique.

7a-168. Zinc Coatings: Thickness and Protection. *Electroplating and Metal Finishing,* v. 1, July 1948, p. 445-448.

Methods and recommendations.

7a-169. Developments in Electrostatic Paint Spraying. *Electroplating and Metal Finishing,* v. 1, July 1948, p. 449-451.

English unit designed for uniform covering of odd-shaped objects.

7a-170. The Theory and Practice of Metal Degreasing in Aqueous Media. P. D. Liddiard. *Chemistry & Industry,* July 10, 1948, p. 435-437.

7a-171. How to Paint the Product. Part 2. H. E. Linsley. *American Machinist,* v. 92, July 29, 1948, p. 89-100.

Brush painting, and the care and maintenance of bristle and synthetic-fiber brushes. Dip painting, roller coating, and centrifugal painting, and the use of an electrostatic field for detearing. The various types of spray booths and baking ovens are discussed, and information is given on methods of inspection. Safety precautions.

7a-172. Brushes in the Finishing Industry. A. J. Chandler. *Plating,* v. 35, Aug. 1948, p. 819-821.

Various types of rotary brushes, and how to select the proper type for specific applications.

7a-173. Organic Finishes for Metal Products. *Steel,* v. 123, July 26, 1948, p. 71-73; Aug. 9, 1948, p. 83-84, 86, 88, 90, 93.

Physical and chemical properties of vinyloid and chlorinated rubber-base coatings, and notes some trends in synthetic coatings. Testing organic finishes—salt spray, moisture, alkali, stain and grease resistance, hardness and distensibility tests. (To be continued.)

7a-174. Die Castings Must be Clean. Part II. Arthur P. Schulze. *Products Finishing,* v. 12, Aug. 1948, p. 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52.

Cleaning techniques employing aqueous solutions of alkaline-type compositions. Hot still tank cleaning, electrocleaning, and pressure-machine washing. 20 ref.

7a-175. The Formation of Copper Films on Non-Conductors—A Survey. Samuel Wein. *Metal Finishing,* v. 46, Aug. 1948, p. 58-60, 69.

Details a practical method for producing Cu films on nonconductors and the literature on this subject. 47 ref.

7a-176. Phosphatization of Metallic Surfaces. Michael A. Streicher. *Metal Finishing,* v. 46, Aug. 1948, p. 61-69.

Metals are given phosphate coatings by subjecting them to a dilute, aqueous solution containing one or more primary phosphates of zinc, iron, or manganese, phosphoric acid, and various types of accelerators. Coatings are produced either by immersion in this solution, or by spraying, for periods varying from a few seconds to one hour. 67 ref.

7a-177. Die gunstigsten Werte fur das Oberflächendrucken von zylindrischen Drehstabfedern. (Optimum Surface Working of Cylindrical Torsion-Rod Springs.) O. Föppl. *Metalloberfläche,* v. 1, June 1947, p. 133-137.

Theory and different methods of increasing fatigue strength of metals by means of surface working. The effect of crystal size, amount of pressure, and time of pressure application.

7a-178. Uber säurefeste Anstriche und Lackierungen. (Acid Resistant Coatings of Paint and Lacquer.) A. Kufferath. *Metalloberfläche,* v. 1, June 1947, p. 140-141.

Different acid resistant paints and lacquers and methods of preparing the metal surfaces for coating with these materials.

7a-179. Scheuern und Polieren von Massenwaren in Trommeln (Rollfässern) und Glocken. (Scouring and Polishing of Mass-Produced Articles in Drums and Bells.) H. Krause. *Metalloberfläche,* v. 1, July 1947, p. 169-171.

Principle of ball-polishing, cleaning and preparation of articles to be polished, the length of polishing and preparation of polishing solutions and other polishing compounds. Different types of ball-polishing drums.

7a-180. Die Herstellung hitzebeständiger Metallwerkstucke durch besondere Oberflächenveredelung. (Rendering Metals Heat Resistant by Special Surface-Enameling Processes.) August Kufferath. *Metalloberfläche,* v. 1, July 1947, p. 171-173.

Production of heat resistant surface coatings by means of aluminum diffusion, aluminum plating, and aluminizing. 14 ref.

7a-181. The Utilization of Enamel A-14F for Painting Turbine Assembly Surfaces Which are Exposed to Oil. (In Russian.) M. F. Sichikov and E. O. Molotova. *Kotloturbostroenie* (Boiler and Turbine Manufacture) March-April 1948, p. 30-31.

The Ural Turbine factory's enamel A-14F is investigated fully and then recommended for painting turbo-dynamo surfaces which are exposed to oil.

7a-182. Preparation of Metal Surfaces for Organic Coatings. G. R. Hoover. *Corrosion,* v. 4, Aug. 1948, p. 399-411.

Methods and results of cleaning and chemically treating surfaces of metals preparatory to receiving an organic coating.

7a-183. Organic Finishes for Metal Products. (Concluded.) *Steel,* v. 123, Aug. 23, 1948, p. 77-82, 112.

Abrasion, impact, adhesion and heat resistance testing, and the electrographic technique for porosity evaluation of protective coatings. Means of effective control over application, processing and handling of finished products.

7b—Ferrous

7b-135. Reversing a Natural Process Cleans Metals More Economically. *Inco Magazine,* v. 22, Summer 1948, p. 13-14.

Sodium-hydride descaling process.

7b-136. Finishing Home Freezer Cabinets. J. R. Streeter. *Industrial Finishing,* v. 24, July 1948, p. 26-28, 30, 32.

How Kelvinator home freezers and ice-cream cabinets are finished.

7b-137. Painting Chevrolets in California Plant. Fred M. Burt. *Industrial Finishing,* v. 24, July 1948, p. 36-38, 40, 42, 44, 46, 49.

7b-138. Finishing of Washers and Ironers at Apex Electrical Manufacturing Co. Plant. *Industrial Heating,* v. 15, July 1948, p. 1193-1194, 1196, 1198, 1200, 1202-1204.

7b-139. Spraying Porcelain Enamel; Some Practical Hints for the Operator. L. W. Lammiman. *Enamelist,* v. 25, July 1948, p. 17-24.

7b-140. Magnetism Applied to Silk-Screen Processing on Porcelain Enameled Sheets. E. H. Brandenburg. *Enamelist,* v. 25, July 1948, p. 50-51, 54.

Design of magnetic table which accommodates a wide range of sheet sizes and which is quickly adjustable. Decorative patterns are also held in contact with curved or irregular surfaces without jigs or clamps, the underside of the pattern being coated with ferrous material.

7b-141. Interpretation of Data Relating to Coefficient of Expansion of Various Types of Porcelain Enamels. Part II. R. L. Fellows and O. R. Novy. *Better Enameling,* v. 19, July 1948, p. 6-11, 33.

Results of an investigation made to determine whether the precipitation of an opacifier from a frit has any effect on the coefficient of expansion of the enamel and also whether the correlation of coefficient of expansion and expansiometer tests as described in Part I holds true for various types of porcelain enamels.

7b-142. Trouble Shootin'. John L. McLaughlin. *Better Enameling,* v. 19, July 1948, p. 16-17.

Enameling defects; foreign bodies embedded in the iron and rusty conditions.

7b-143. The Relation of Firing Temperature to Warpage of Fabricated Parts. B. D. Bruce. *Better Enameling,* v. 19, July 1948, p. 18.

Recommends firing below 1330°C., the lower critical temperature for steels with more than 0.04% C., to prevent warpage.

7b-144. Coating Steel With Nickel by Immersion in Nickel Chloride Solutions. W. A. Wesley and H. R. Copson. *Journal of the Electrochemical Society,* v. 94, July 1948, p. 20-31.

A simple method for depositing controlled amounts of nickel on steel by chemical displacement from a hot nickel chloride, boric acid solution. Deposits to 30 millionths inch in thickness can be readily produced. Suitable heat treatment of these deposits renders them compact and adherent and at the same time causes diffusion of the nickel and iron. It is believed that steel coated in this way has its surface altered sufficiently to serve as a better basis for other coatings.

7b-145. Sensitivity of Different Steels to Pickling Brittleness. C. A. Zapffe and M. E. Haslem. *Wire and Wire Products,* v. 23, July 1948, p. 563-569, 609-612.

An investigation on behavior of steels under conditions of cathodic pickling vs. straight acid pickling.

(Turn to page 24)

AMERICAN WELDING SOCIETY *(Cont.)*

Tuesday, Oct. 26

2:00 p. m.—Rose Garden

CUTTING

Chairman—H. B. Seydel
Air Reduction Sales Co.
Cochairman—E. R. McClung
Lukenweld Inc.

Powder Cutting and Scarfing in the Steel Industry, by Frank A. Snyder, Carnegie-Illinois Steel Corp.

A Method of Controlling Cutting Tip Clearance, by R. B. Steele and H. G. Hughey, Air Reduction Sales Co.

The Stability of Oxy-Acetylene Flames, by L. D. Conta, Air Reduction Sales Co.

2:00 p. m.—Burgundy Room

RAILROAD COMMITTEE OPEN MEETING

4:30 p. m.—Convention Hall

EDUCATIONAL LECTURE SERIES

Chairman—W. F. Hess
Rensselaer Polytechnic Institute

The Metallurgy of Arc Welds in Steel, by R. D. Stout, Lehigh University.

Wednesday, Oct. 27

9:30 a. m.—Rose Garden

WELDABILITY

Chairman—Clarence E. Jackson
Union Carbide and Carbon Research Laboratories, Inc.
Cochairman—R. E. Somers
Bethlehem Steel Co.

Strain-Aging in Welding Low-Carbon Structural Steel, by W. H. Bruckner and W. E. Ellis, University of Illinois.

The Influence of Chemical Composition on the Performance of Welded Plates Subject to Concentrated Stress, by J. Heuschkel, Westinghouse Electric Corp., Research Labs.

Notch Toughness of a Variety of Welded Low-Carbon Steels, by E. F. Nippes, Jr., and Warren F. Savage, Rensselaer Polytechnic Institute.

Weldability of Cast Carbon and Alloy Steels, by Sidney Low and V. T. Malcolm, Chapman Valve Mfg. Co.

9:30 a. m.—North Garden

ARCS AND ELECTRODES

Chairman— J. H. Deppeler
Metal & Thermit Corp.
Cochairman—J. H. Humberstone
Arcrods Corp.

Arc Phenomena With Electrodes Moving at High Speeds, by W. B. Kouwenhoven and T. B. Jones, Johns Hopkins University.

A. W. S. Headquarters at Bellevue-Stratford Hotel

An Investigation of Methods for Evaluating Welding Arc Stability and Their Application, by R. A. Wyant, Lauriston P. Winsor, and L. M. Schetky, Rensselaer Polytechnic Institute.

The Comparative Behavior of Mild Steel Welds Made With E6010 and E6016 Electrodes, by F. W. Daniels, F. S. Gardner, and R. M. Rood, General Electric Co.

9:30 a. m.—South Garden

RESISTANCE WELDING

Chairman—G. N. Sieger
S. M. S. Corp.
Cochairman—K. W. Ostrom
K. Wm. Ostrom & Co.

The Resistance Welding Characteristics of the Dry Disc Rectifier Welder, by R. H. Blair and C. E. Smith, Taylor-Winfield Corp.

The Importance of Temperature Measurements in the Establishment of Optimum Flash Welding Conditions, by R. M. Curran, P. Patriarca and W. F. Hess, Rensselaer Polytechnic Institute.

Resistance Welding Cross Wires, by R. C. Jones, Taylor-Winfield Corp.

Preliminary Test of Spot Weld Shunting in 24 S-T Alclad, by A. R. Hard, State College of Washington.

2:00 p. m.—North Garden

CUTTING

Chairman—A. B. Gordon
Linde Air Products Co.
Cochairman—R. D. Thomas
Arcos Corp.

Specialized Steel Mill Cutting Machines and Controls, by R. F. Helmkamp and A. H. Yoch, Air Reduction Sales Co.

Corrosion Resistance of Powder-Cut Stainless Steels, by L. E. Stark and C. R. Bishop, Union Carbide and Carbon Research Laboratories, Inc.

Structural I-Beam Cut-Off Machine, by G. J. Strate, Air Reduction Sales Co.

2:00 p. m.—Rose Garden

INERT-GAS SHIELDED-ARC WELDING

Chairman—H. E. Rockefeller
Linde Air Products Co.
Cochairman—Walter Mehl
Heintz Manufacturing Co.

The Effect of D.C. Component in A.C. Inert-Gas Arc Welding of Aluminum, by G. J. Gibson and G. R. Rothschild, Air Reduction Sales Co.

Design Features of Inert-Gas Shielded-Arc Welding and Control Equipment, by N. E. Anderson, Air Reduction Sales Co.

The Effect of Wave Shape in Inert-Arc Welding Circuits, by R. W. Tuthill, General Electric Co.

Wednesday, Oct. 27

2:00 p. m.—South Garden

RESISTANCE WELDING

Chairman—O. C. Frederick
General Electric Co.
Cochairman—B. L. Wise
National Electric Welding Machine Co.

Thermal Resistance of Metal Contacts, by W. B. Kouwenhoven and J. H. Potter, Johns Hopkins University.

Projection Welding, by Wendell F. Hess, Rensselaer Polytechnic Institute.

Spot Welding Schedules for Nickel and Nickel Alloys, by F. G. Harkins, Solar Aircraft Co.

4:00 p. m.—Convention Hall

EDUCATIONAL LECTURE SERIES

Chairman—Finn Jonassen
National Research Council

The Metallurgy of Arc Welds in Steel, by R. D. Stout, Lehigh University.

8:00 p. m.—Clover Room

SECTION OFFICERS CONFERENCE

8:00 p. m.—Green Room

UNIVERSITY CONFERENCE

Thursday, Oct. 28

9:30 a. m.—Rose Garden

STRUCTURAL

Chairman—W. E. Hendricks
Belmont Iron Works
Cochairman—Van Rensselaer P. Saxe
Consulting Engineer

Welded Bridges, by LaMotte Grover, Air Reduction Sales Co.

Fabrication of Structural Steel Sections by Submerged-Melt Welding, by J. W. Tippett, Linde Air Products Co.

Flexible Beam and Girder Connections in a Large Welded Structure, by Harry Greaves, Atlantic Refining Co.

The Plastic Behavior of Wide Flange Beams, by W. H. Luxion, L. S. Beedle, C. H. Yang, and B. G. Johnston, Lehigh University.

(Continued on page 25)

7b-146. Vitreous Enamelling Technique. *Electroplating and Metal Finishing*, v. 1, July 1948, p. 442-444, 458.

Process will permit application of relatively thin coatings with very little tendency to chipping and cracking.

7b-147. Corrosion Inhibiting Primers for Ferrous Metals. W. G. Huckle and H. S. Davidson. *Paint, Oil & Chemical Review*, v. 111, July 22, 1948, p. 18, 20-22, 24-28.

Results of an extensive experimental investigation of the effects on primer performance of introducing additional pigments into Zn-yellow primers. Seventeen different pigments or auxiliary materials were evaluated. Effects of various preparation factors.

7b-148. Strip Tension and Velocity Control. Chris Diechert. *Steel*, v. 123, July 26, 1948, p. 69-70, 102.

Use as key factors in continuous cleaning, plating, and coiling steel venetian-blind stock.

7b-149. Process Sheet for Chromising Steel. George Black. *American Machinist*, v. 92, July 29, 1948, p. 123.

Recommended procedures.

7b-150. First in New Ceramic Era—Lustron's $13 Million Plant. *Ceramic Industry*, v. 51, Aug. 1948, p. 56-58, 102.

Largest porcelain enameling operation in the world.

7b-151. How to Prevent Defects in Porcelain Enameling Holloware. Part V. Tearing. F. A. Petersen. *Ceramic Industry*, v. 51, Aug. 1948, p. 59-60.

7b-152. Porcelain Enamel Process Defects; Causes and Possible Cures. Part V. Jumpers, Pop-Off, Copper-Heads. M. E. McHardy. *Ceramic Industry*, v. 51, Aug. 1948, p. 61-62.

(To be continued.)

7b-153. Frigidaire's Canadian Enameling Plant. R. G. Drinnan. *Finish*, v. 5, Aug. 1948, p. 19-22, 63, 65, 68, 70.

7b-154. Waterlining as Related to Dry Beading. A. I. Andrews and W. D. Fitzpatrick. *Finish*, v. 5, Aug. 1948, p. 23-27, 56, 62.

Titanium-opacified cover enamels are said to be especially subject to waterlining when wet beading enamel is applied to the wiped edge of previously dried cover enamel. This results in some of the water from the beading enamel soaking into the dry cover coat bisque, discoloring it and sometimes causing tearing. Seven types of cover-coat enamels and three types of beading enamels were investigated for the effects of various factors on waterlining. The latter included rate of drying; use of different frits; use of organic-liquid vehicles; time and temperature of firing; use of different mill additions; aging; use of different soluble salts during firing; and use of firing agents.

7b-155. Production of Commercial and Reachin Refrigerators; Applying Zirconium Cover Coat Direct to Titanium Steel. M. E. McHardy. *Finish*, v. 5, Aug. 1948, p. 42, 62.

Development of satisfactory procedures.

7b-156. Electrolizing Prolongs Tool Life and Protects Wear Parts. *Tool & Die Journal*, v. 14, Aug. 1948, p. 56.

New process-treatment said to greatly prolong life of cutting tools, dies, gages, and wear parts. It involves a high-frequency treatment which raises the fatigue point of the tools, and a process of evaporation and condensation by which a 0.00003 to 0.00005 in. layer of a new hard alloy is deposited upon the cutting edges or working surfaces.

7b-157. Continuous Strip Pickling. Edwin D. Martin. *Blast Furnace and Steel Plant*, v. 36, July 1948, p. 825-832. Aug. 1948, p. 942-949, 953.

Previously abstracted from *American Iron and Steel Institute, Preprint*, 1948. See item 7b-116.

7b-158. Continuous Coating of Steel Strip: I. F. M. Morrow and K. Oganowski. *Industrial Heating*, v. 15, July 1948, p. 1166, 1168, 1170, 1172. A condensation.

Processing of the metal base, coil tempering, quality control, production rates, cost aspects, continuous-line operation problems, and equipment design, as applied to continuous coating of steel strip in coils and sheets. (To be continued.)

7b-159. Chromising Steel Surfaces. George Black and Edward Rosen. *Metal Finishing*, v. 46. Aug. 1948, p. 70-72.

Chromising is a general term covering various metnods for producing on the surface of steel parts an integral layer high in chromium content. The coating is formed by means of a diffusion process in which iron atoms are gradually replaced by chromuim atoms so that the resultant chromised layer is rich in chromium at the surface, showing a gradual decreasing chromium content with increasing depth.

7b-160. Aluminum Coating of Steel Products. Armand Di Giulio. *Wire and Wire Products*, v. 23, Aug. 1948, p. 670-675.

Applications and methods employed with Upton salt-bath method.

7b-161. Coatings That Laugh at Heat, Wear, Corrosion. *Modern Industry*, v. 16, Aug. 15, 1948, p. 40-44.

Many uses of porcelain enamel as a coating for steels and other materials. Progress in developing high-temperature enamels, elimination of ground coat, low-temperature enamels, and special enamels.

7c—Nonferrous

7c-32. The Preparation and Optical Properties of Gold Blacks. Louis Harris, Rosemary T. McGinnies, and Benjamin M. Siegel. *Journal of the Optical Society of America*, v. 38, July 1948, p. 582-589.

The optical properties of gold smokes deposited on cellulose nitrate films under different experimental conditions. Conditions of pressure, gas purity, rate of evaporation, and distance between source and deposition surface giving the highest infrared absorption per unit mass were found. The thermal mass required for high infrared absorption is small compared to the thermal masses of other receivers used for infrared measurements. The particle size and particle distribution of the gold smokes deposited under different experimental conditions were investigated with the electron microscope.

7c-33. Deposition of Nickel and Cobalt by Chemical Reduction. Abner Brenner and Grace Riddell. *British Chemical Digest*, v. 2, July 1948, p. 322-325.

The rate of deposition in the acid solution is virtually unaffected by the concentration of the reactants, and in the alkaline solution is affected only by the concentration of the hypophosphite and not by that of the nickel. Therefore, the reaction does not follow a simple course, but undergoes intermediate steps. Attempts to explain the reaction by one of two hypotheses neither of which is applicable to all the phenomena.

Make Your Hotel Reservations
See Page 61

7d—Light Metals

7d-36. Economical Cleaning of Aluminum Slat Stock for Venetian Blind Manufacture. *Modern Metals*, v. 4, July 1948, p. 24-26.

A rapid and economical method for cleaning and coating aluminum slat stock in preparation for painting. Treatment is based on coating with a green material known as "Alodine".

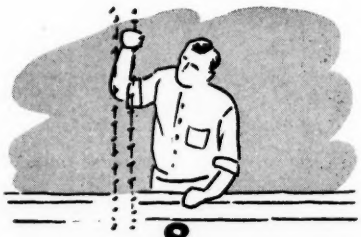
7d-37. Aluminum Spray Coating to Protect Welded Units. Merrill A. Scheil. *Metal Progress*, v. 54, July 1948, p. 64.

Properties and advantages.

7d-38. Surface-Finishing Magnesium Parts. *Modern Metals*, v. 4, Aug. 1948, p. 12-15.

The tumbling-finishing method, known as Roto-Finishing, as well as the equipment used, types of chips and compounds employed. Procedures employed for grinding, deburring, polishing, britehoning and coloring. Some of the known advantages for mechanical finishing.

For additional annotations indexed in other sections, see:
6d-22; 16a-67.



8
ELECTRODEPOSITION and ELECTROFINISHING

8-169. The Anodizing and Dyeing of Aluminum and Its Alloys. C. C. Hanson. *Journal of the Birmingham Metallurgical Society*, v. 28, June 1948, p. 100-127.

Properties of Al and Al alloys with regard to corrosion resistance and suitability for anodic oxidation, and the anodizing process itself, including fundamentals and operating procedures. Various bath compositions and procedures. Suggested plant layout, and flow sheet. 13 ref.

8-170. Control of Electroplating Solutions by Analysis and Observation. II. Available Methods, Applications and Accuracy of Results Obtained. K. E. Langford. *Electroplating and Metal Finishing*, v. 1, July 1948, p. 426-428, 458.

Gravimetric and volumetric methods.

8-171. Continuously Electroplated Steel Strip and Sheet. A. Smart and F. H. Smith. *Electroplating and Metal Finishing*, v. 1, July 1948, p. 435-439; discussion, p. 439-441.

Reasons for pre-plating steel strip and methods of manufacturing this material.

8-172. Better Deposits at Greater Speeds by PR Plating. George W. Jernstedt. *Plating*, v. 35, July 1948, p. 708-713.

Refers to periodic-reverse electroplating (reversing the current briefly at short periodic intervals to remove unsound deposits). Advantages and required equipment.

(Turn to page 26)

AMERICAN WELDING SOCIETY *(Cont.)*

Thursday, Oct. 28

9:30 a. m.—North Garden

INERT-GAS SHIELDED-ARC WELDING

Chairman—R. F. Wyer
General Electric Co.
Cochairman—G. O. Hoglund
Aluminum Co. of America

Practical Aspects of the Inert-Gas Shielded-Arc Welding Process, by A. N. Kugler and H. A. Huff, Jr., Air Reduction Sales Co.

Welding Pure Copper for Pressure Vessels to A.S.M.E. U69 and Case 934 With Heliarc Process, by John W. Mortimer, Whitlock Mfg. Co.

Production Heliwelding Stainless Steel, by Newton A. Blickman, S. Blickman, Inc.

Inert-Gas Shielded Spot Welding, by Frank J. Pilia, Linde Air Products Co.

9:30 a. m.—South Garden

MAINTENANCE

Chairman—George Nigh
Tide Water Associated Oil Co.
Cochairman—H. R. Morrison
Linde Air Products Co.

Diversified Welding in Chemical Plant Maintenance, by Elvin M. Ratcliff, Ethyl Corp.

Welding in Steel Mill Maintenance, by L. P. Elly, Bethlehem Steel Co.

What a Maintenance Department Can Do With Welding and Cutting, by Jamison Moore, Union Bag & Paper Co.

Evening—Rose Garden

ANNUAL DINNER

Friday, Oct. 29

9:30 a. m.—South Garden

AUTOMATIC WELDING

Chairman—T. M. Jackson
Sun Shipbuilding & Dry Dock Co.
Cochairman—George Johnson
Lincoln Electric Co.

Automatic Submerged-Arc Welding of One-Inch Alloy Steel Plates, by Howard L. Miller, Republic Steel Corp.

Production Tooling for Automatic Welding, by Cecil C. Peck, Cecil C. Peck Co.

9:30 a. m.—Rose Garden

MISCELLANEOUS

Chairman—Geo. Trefts
Farrar & Trefts Inc.
Cochairman—A. A. Holzbaur
Sun Shipbuilding & Dry Dock Co.

Ceramic and Composite Back-Ups for Grooved Weld Joints, by Chester R. Austin and P. J. Rieppel, Battelle Memorial Institute.

All Welded Fabrication of Shipping Containers by Resistance and Fusion Methods, by G. J. Green and D. H. Marlin, Dravo Corp.

The Future Welded Design of Farm Equipment, by Ernest J. Koop, Ernest J. Koop Welding and Blacksmith Shop.

Friday, Oct. 29

9:30 a. m.—North Garden

HARD FACING AND FLAME HARDENING

Chairman—C. H. Jennings
Westinghouse Electric Corp.
Cochairman—R. A. Guenzel
Southern Oxygen Co.

The Economies of Hard Facing, by J. J. Barry, and Albert Muller, Air Reduction Sales Co.

Hard Facing and Surfacing With the Inert-Gas Shielded-Arc Welding Process, by K. H. Koopman, Linde Air Products Co.

Flame Hardening Methods and Techniques, by J. R. Burg, Baldwin Locomotive Works.

2:00 p. m.—Clover Room

BUSINESS SESSION

3:00 p. m.—Green Room

BOARD OF DIRECTORS MEETING

Seminar on the Cold Working of Metals

Arranged by M. Gensamer for the American Society for Metals

Benjamin Franklin Hotel, Philadelphia

Oct. 23 and 24, 1948

Saturday, Oct. 23

9:30 a. m.—Ballroom

Introduction, by M. Gensamer, Carnegie-Illinois Steel Corp.

Strain Hardening, Effects of Alloying Elements and Microstructure, by G. V. Smith, U. S. Steel Corp. Research Laboratories.

Residual Stresses (Macroscopic), by W. M. Baldwin, Jr., Case Institute of Technology.

Slip Lines and Slip Bands (Visual Effects of Cold Working), by R. D. Heidenreich, Bell Telephone Laboratories.

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Saturday, Oct. 23

2:00 p. m.—Ballroom

Translation, Twinning and Banding (Crystallographic Mechanism), by C. S. Barrett, Institute for the Study of Metals, University of Chicago.

Deformation Textures, by R. M. Brick, University of Pennsylvania.

Recrystallization Textures, by C. G. Dunn, General Electric Co.

8:00 p. m.—Ballroom

Dislocation Theory, by W. Schockley, Bell Telephone Laboratories.

Nucleation Theory, by J. H. Hollomon, General Electric Co.

Effects of Mechanical-Thermal History on the Flow Stress, by J. E. Dorn, University of Michigan.

Sunday, Oct. 24

9:30 a. m.—Ballroom

Dynamics of Slip Bands, by C. Zener, Institute for the Study of Metals, University of Chicago.

Plastic After-Effects, by J. G. Leschen, General Electric Co.

Workhardening Under Combined Stresses, by L. R. Jackson, Battelle Memorial Institute.

2:00 p. m.—Ballroom

Creep, by J. D. Lubahn, General Electric Co.

Fatigue, by A. M. Freudenthal, University of Illinois.

Reactions in the Solid State, by B. L. Averbach, Massachusetts Institute of Technology.

6:00 p. m.—Ballroom

INFORMAL DINNER

8-173. Some Metallurgical Aspects of Electrodeposits. (Continued.) Carl E. Heussner, A. R. Balden, and L. M. Morse. *Plating,* v. 35, July 1948, p. 719-723, 768.

Internal stress and adhesion and their measurement; also effects of physical properties and conditions on appearance, corrosion resistance, and fatigue life. Technique for measuring and calculating internal stresses.

8-174. Adhesion of Electrodeposits. VI. Determination of Adhesion Through the Use of Cement. A. L. Ferguson, and M. V. Tsao. *Plating,* v. 35, July 1948, p. 724-729.

It was thought that the most satisfactory method for determining adhesion would be one that would make use of a direct pull perpendicularly to the surface. Bond-shear strengths were obtained for a large number of recently developed high-strength cements and bonding techniques, although no work was done on actual electrodeposits. Bond strengths of only 4000 to 6000 psi. were obtained, and these not consistently, using Bakelite XJ 16320 cement; other cements gave even lower values.

8-175. Lead Plating; Method of Deposition on Bronze Bearing Surfaces. H. Silman and M. F. E. Fry. *Metal Industry,* v. 73, July 16, 1948, p. 48-50. A condensation.

Procedure and use of lead plating to increase the life of aluminum-bronze rotors for fuel pumps for gas-turbine engines.

8-176. Plating Zinc Diecastings at Gerity-Michigan. William MacLeay. *Iron Age,* v. 162, July 29, 1948, p. 90-94.

Procedures used on two electroplating lines handling the bulk of the Zn-base die castings. One of these is an automatic line for small and medium-sized work and the other is a deep-tank line for large pieces such as automobile grilles.

8-177. Purification of a Small Watts Type Nickel Plating Bath. N. L. Carter. *Plating,* v. 35, Aug. 1948, p. 815-817, 864.

Includes introduction by J. J. Dale. Experiences in purification of a 300-gal. bath which had been in use for five years without any purification except filtration. Treatments recommended for removal of different types of impurity and for prevention of different undesirable surface effects, as well as pH and current densities for removal of metallic impurities. 11 ref.

8-178. Electroplating of Roller Chain. G. G. Mize. *Plating,* v. 35, Aug. 1948, p. 818.

Association of Roller and Silent Chain Manufacturers has concluded that plating of assembled precision steel-roller transmission chains is extremely hazardous.

8-179. Screening at V. H. F. B. Roston. *Wireless Engineer,* v. 25, July 1948, p. 221-230.

Very high frequency properties of various metallic surfaces which are economic and which may be readily adapted to production. An analysis of the problem of shielding shows that in the case of a receiver, where only the radiation field requires to be screened, a conducting sheet makes an efficient shield. An experimental method has been developed by which the efficacy of various forms of metallic shield may be assessed. Tests upon electrodeposited steel specimens and sprayed-metal specimens have given results which confirm the theoretical deductions and determine the order of their screening efficacy.

8-180. The Ferrostan Electrolytic Tinning Line at Richard Thomas and Baldwins, Ltd., Ebbw. Vale. *Journal of the Iron and Steel Institute,* v. 159, July 1948, p. 297-314.

Description and operation of plant; civil engineering aspects; mechanical engineering features; and electrical engineering features.

8-181. The Physical Properties of Electrodeposits—Their Determination and Significance. Seymour Senderoff. *Metal Finishing,* v. 46, Aug. 1948, p. 48-57.

The significance of each of the properties to the general requirements of electroplates, and to particular requirements in specific applications, together with the most reliable methods for measuring these properties. 15 ref.

8-182. Oberflächenschutz von Stahl durch Kupferplattierung. (Copper Plating as a Surface Protection of Steel.) (Conclusion.) Hans Bröking. *Metalloberfläche,* v. 1, June 1947, p. 137-139.

Precautions to be taken in production of articles of copper-plated sheet steel. Methods of preparing the sheets for welding and flanges.

8-183. Elektrolytisch gewonnene Wolfram-Kobalt-, Wolfram-Nickel- und Wolfram-Eisen-Legierungen. (Electrolytic Tungsten-Cobalt, Tungsten-Nickel, and Tungsten-Iron Alloys.) H. Offermanns and M. v. Stackelberg. *Metalloberfläche,* v. 1, June 1947, p. 142-144.

Methods of obtaining tungsten alloys by electrolysis and a process of making alloys of iron, cobalt, and nickel with a maximum of 50% W. The effect of the pH value, temperature and current density, the hardness and corrosive resistance of electrolytic W-Co alloy, as well as the crystal structures of these tungsten alloys.

8-184. Entfernen von Nitraten aus galvanischen Bädern, bevorzugt aus Nickelbädern. (Removing Nitrates From Electrolytic Baths, Especially From Nickel Baths.) Rudolf Wommelsdorf. *Metalloberfläche,* v. 1, July 1947, p. 164-165.

A simple method for the above.

8-185. Abblättern und Abschälen von Vernicklungen I. (Peeling and Scaling of Nickel-Plating. Part I.) T. Richards. *Metalloberfläche,* v. 1, July 1947, p. 173-176.

Analyzes systematically the different causes of peeling and scaling of nickel-plated metals and indicates methods of preventing this effect. (To be concluded.)

8-186. Plating Bath Troubles. H. J. Sedusky and J. B. Mohler. *Metal Industry,* v. 73, July 30, 1948, p. 91-93.

Off-color deposits, blistered deposits, poor adhesion, rough deposits, low cathode frequency, high metal content, and poor anode corrosion are but some of the common troubles which from time to time confront every electrodepositor. Methods of dealing with these troubles. (To be concluded.)

8-187. Electroplated Finishes on Aluminum. Rick Mansell. *Light Metal Age,* v. 6, Aug. 1948, p. 24, 27.

A general summary of standard electroplating methods for different finishes.

For additional annotations indexed in other sections, see: 6d-23; 7b-148.

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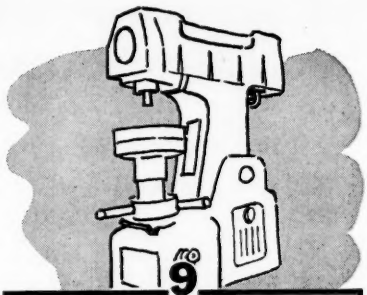


9 PHYSICAL and MECHANICAL TESTING

9a—General

9a-51. Notch Tensile Testing. J. D. Lubahn. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40B), 1948, p. 90-132.

Knowledge necessary for successful notch-tensile testing and its interpretation. It is necessary to know, for a variety of notch shapes, the location of initial fracture and the state of stress and strain at the point of initial fracture. Existing knowledge as to the distribution of stress and strain in a notch is said to be inadequate. Valid conclusions also require knowledge concerning other variables. 38 ref.

9a-52. Size Effects in Steels and Other Metals From Slow Notch Bend Tests. Paul E. Shearin, Arthur E. Ruark, and R. M. Trimble. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40B), 1948, p. 167-188.

Special apparatus developed for high-precision measurement of the above. Factors studied were: orientation, cleanliness, austenitic grain size, hardness level, change in microstructure associated with varying temperatures of isothermal transformation, and temper embrittlement. Results for Ni-Cr steel and for 24-ST aluminum samples in various sizes and shapes.

9a-53. Some New Testing Machines for Combined Stress Experiments. Joseph Marin. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40B), 1948, p. 189-200.

Previously abstracted from *Automotive Industries,* v. 98, May 15, 1948, p. 46-47, 78. See item 9a-33, 1948.

9a-54. The Tensile Test. A. H. Cottrell. *Journal of the Birmingham Metallurgical Society,* v. 28, June 1948, p. 69-72; discussion, p. 73-74.

Fundamental principles.

9a-55. Pre-Stressing of Springs. J. A. Pope. *Wire Industry,* v. 15, July 1948, p. 455-456.

Results obtained from preliminary static torsion tests on overstrained specimens of carbon spring steel. This exploratory work gives a picture of the type of change in properties in a torsionally overstrained bar, the overall effect of the change on apparent properties of the bar, and possible limitations which have to be observed in order to obtain maximum benefit from pre-stressing alone.

9a-56. Testing Machine Aids Industrial Research at University of Wash-

(Turn to page 28)

Institute of Metals Division

A.I.M.E.

Annual Fall Meeting

Hotel Adelphia, Philadelphia

Oct. 25 through 27, 1948

Monday, Oct. 25

9:00 a. m.—Jefferson Room

PROPERTIES OF METALS AND ALLOYS

Chairmen—P. R. Kosting
W. A. Johnson

The Room and Elevated Temperature Properties of Some Sand-Cast Magnesium-Base Alloys Containing Zinc, by T. E. Leontis, Dow Chemical Co.

The Low-Temperature Properties of Tin and Tin-Lead Alloys, by H. S. Kalish and F. J. Dunkerley, University of Pennsylvania.

Thermal and Electrical Properties of Ductile Titanium, by E. S. Greiner and W. C. Ellis, Bell Telephone Laboratories, Inc.

Property Changes During Aging, by A. H. Geisler, General Electric Co.

9:00 a. m.—Crystal Room

MICROSCOPY AND GRAIN GROWTH

Chairmen—D. L. Martin
J. S. Burke

Correlation of Optical and Electron Microscopy, by J. S. Bryner, Pennsylvania State College.

Fractographic Study of Cast Molybdenum, by C. A. Zapffe, F. K. Landgraf and C. O. Worden, Metallurgists, Baltimore, Md.

Effect of Composition on Grain Growth in Aluminum-Magnesium Solid Solutions, by L. J. Demer, Murray Co., Inc., and P. A. Beck, University of Notre Dame.

Effect of a Dispersed Phase on Grain Growth in Aluminum-Manganese Alloys, by P. A. Beck, M. L. Holzworth and Philip Sperry, University of Notre Dame.

See Page 61 for Metal Congress Hotel Reservations

2:00 p. m.—Jefferson Room

PROPERTIES OF METALS AND ALLOYS

Chairmen—R. S. French
E. W. Palmer

Factors Affecting the Tensile Notch Sensitivity of Magnesium Alloy Extrusions, by I. Cornet, University of California.

Effect of Grain Size on Tensile Strength, Elongation and Endurance Limit of Deep Drawing Brass, by H. L. Walker and W. J. Craig, University of Illinois.

A Copper-Base Alloy Containing Iron as a High-Strength, High-Conductivity Wire Material, by Webster Hodge, R. I. Jaffee, J. G. Dunleavy and H. R. Ogden, Battelle Memorial Institute.

A High-Strength, High-Conductivity Copper-Silver Alloy Wire, by Webster Hodge, R. I. Jaffee, J. G. Dunleavy and H. R. Ogden, Battelle Memorial Institute.

2:00 p. m.—Crystal Room

CONSTITUTION AND PRECIPITATION

Chairmen—G. E. Doan
W. L. Fink

The Cobalt-Chromium Binary System, by A. R. Elsea, A. B. Westerman and G. K. Manning, Battelle Memorial Institute.

Solubility of Iron in Solid Aluminum, by J. K. Edgar, Aluminum Research Laboratories.

Mechanism of Precipitation in a Permanent Magnet Alloy, by A. H. Geisler, General Electric Co., and J. B. Newkirk, Carnegie Institute of Technology.

Some Effects of Applied Stresses on Precipitation Phenomena, by W. L. Finlay, Remington Arms Co., and W. R. Hibbard, Jr., Yale University.

Tuesday, Oct. 26

9:00 a. m.—Jefferson Room

PLASTIC DEFORMATION

Chairmen—M. Gensamer
W. R. Hibbard, Jr.

Statistical Rate Theory of Metals—Mechanism of Flow and Application to Tensile Properties, by J. W. Fredrickson and Henry Eyring, University of Utah.

Influence of Size and the Stress System on the Flow Stress and Fracture Stress of Metals, by D. J. McAdam, Jr., G. W. Geil, D. H. Woodard and W. D. Jenkins, National Bureau of Standards.

Nucleation of Slip Bands, by J. G. Leschen, R. P. Carreker and J. H. Hollomon, General Electric Co.

Transient Plastic Deformation, by R. P. Carreker, J. G. Leschen and J. D. Lubahn, General Electric Co.

12:15 p. m.—Coral Room

EXECUTIVE COMMITTEE LUNCHEON

2:00 p. m.—Jefferson Room

PLASTIC DEFORMATION

Chairmen—R. F. Mehl
J. C. McDonald

Plastic Deformation of Large-Grained Copper Specimens, by W. R. Hibbard, Jr., Yale University.

Plastic Flow in Anisotropic Sheet Steel, by L. R. Jackson and K. F. Smith, Battelle Memorial Institute, and W. T. Lankford, Carnegie-Illinois Steel Corp.

The Flow and Fracture Characteristics of the Aluminum Alloy 24 S-T After Alternating Tension and Compression, by S. I. Liu and G. Sachs, Case Institute of Technology.

The Effect of Thermal-Mechanical History on the Strain Hardening of Metals, by J. E. Dorn, A. Goldberg and T. E. Tietz, Univ. of Calif.

(Continued on page 29)

TUESDAY, OCT. 26—ROD AND WIRE PRODUCTION PRACTICE

A Symposium Arranged by the Institute of Metals Division Program Committee

O. B. J. Fraser, Symposium Chairman

9:00 a. m.—Crystal Room

Chairmen—S. P. Watkins
F. E. Bash

An Appraisal of Wire Products in Industry, by W. F. Hodges and T. S. Fuller, General Electric Co.

The Production of High-Carbon Steel Wire, by C. W. Garrett, Jones and Laughlin Steel Corp.

The Hot Rolling and Cold Drawing of Some of the Corrosion and Heat Resisting Alloy Rods and Wire, by J. K. Findley, Allegheny Ludlum Steel Corp.

Hot and Cold Working of Nickel-Copper Alloy Rods and Wire, by M. F. Buck and N. C. Britz, International Nickel Co., Inc.

2:00 p. m.—Crystal Room

Chairmen—Alan Morris
N. L. Mochel

The Production of Copper and Copper Alloy Rods and Wire by Rolling and Drawing, by P. H. Kirby, American Brass Co.

Production of Copper-Base Alloy Rod by Hot Extrusion, by L. E. Thelin, Scovill Mfg. Co.

Fabrication of Aluminum and Aluminum Alloy Rod, Bar and Wire, by W. T. Ennor, Aluminum Co. of America.

Production of Magnesium Alloy Rod and Wire, by G. Ansel, Dow Chemical Co.

ington. Howard E. Jackson. *Modern Industrial Press,* v. 10, July 1948, p. 46, 48, 50.

1200-ton-capacity testing machine and some of the work done with it since its recent installation. It has been used for tests on aircraft-wing panels, on a laminated Douglas Fir beam (12 x 24 in.), on 40-in. diameter concrete culvert pipes, and on a test slab used in connection with bridge design.

9a-57. Micro-Hardness Testing; A Consideration of the Special Problems Involved. *Metal Industry,* v. 73, July 9, 1948, p. 26, 33.

Reviews several recent papers.

9a-58. Methods and Instruments for Hardness Testing. A. M. White. *Steel,* v. 123, July 26, 1948, p. 74-76, 78, 80, 82.

Definitions of hardness suggested by numerous investigators since Aristotle; a discussion of the development of hardness testers based on scratch, rebound, penetration, magnetic, and electrical principles; common testers in use today.

9a-59. High-Temperature Disk-Forging Developments for Aircraft Gas Turbines. L. B. Fonda. *Transactions of the American Society of Mechanical Engineers,* v. 70, Jan. 1948, p. 1-9; discussion, p. 9-12.

Concerned chiefly with the Type I-40 turbine wheel for jet engine of the P-80 airplane. Of interest are conclusions drawn from bursting tests carried out on 179 turbine-wheel blanks and six bucketed turbine wheels. Equipment used, various alloys and forging practices, and results obtained. The most important consideration was found to be ductility; the best method of obtaining it—proper control of grain flow. Inspection methods developed were a combination of zyglo and supersonic testing.

9a-60. Fatigue Testing; a Rapid Machine Employing Unmachined Specimens. *Automobile Engineer,* v. 38, July 1948, p. 278.

Apparatus at the 6th International Congress of Applied Mechanics, Paris. A strip-type specimen is held as a cantilever, and with aid of an electromagnet is caused to vibrate at a frequency slightly below resonance. When a crack develops the amplitude of vibration increases. Once a fracture is initiated, crack growth continues with an ever-increasing rapidity. The fatigue test result is obtained within an hour.

9a-61. Effects of Strength and Ductility on Burst Characteristics of Rotating Disks. Arthur G. Holms and Joseph E. Jenkins. *National Advisory Committee for Aeronautics, Technical Note* No. 1667, July 1948, 52 pages.

Results of an investigation conducted to determine influence of strength and ductility on room-temperature burst characteristics of solid disks, disks with large-diameter central holes, and disks with small-diameter central holes. The disk materials consisted of steel, beryllium-copper, aluminum-base alloy, brass, stainless and a nickel-base alloy.

9a-62. What is Strength? (Concluded.) J. B. Caine. *Foundry,* v. 76, Aug. 1948, p. 100-101, 166, 168, 170.

Influence of fatigue strength on the serviceability of castings. Need for more information on notched fatigue strength of cast and wrought metals, which need is made evident by a comparison between strength of severely notched and unnotched specimens. Need for more information on corroding fatigue of cast metals and surfaces. Nondestructive test methods.

9a-63. Magnetic Testing Symposium Features the 1948 A.S.T.M. Meeting. *Electrical Manufacturing,* v. 42, Aug. 1948, p. 121-125, 218, 220.

Papers and discussion covered at the 51st annual session of the society, which included in the symposium, quality control and sampling methods, reports on corrosion tests, plastics and other materials basic to the product designer.

9a-64. A Simple, Accurate Microhardness Testing Device. E. Boerje Bergsman. *Metal Progress,* v. 54, Aug. 1948, p. 183-188.

This apparatus uses an inverted metallographic microscope, whereby the exact location of the spot to be tested can be fixed. The objective is then replaced by another holder in which a pyramidal diamond is accurately centered, and specimen is lowered onto the diamond's point. A counterbalanced lever system regulates the pressure between diamond and specimen between limits of 0.5 and 500 g., and the resulting impression is measured by micrometer eyepiece in the usual manner. Several routine laboratory investigations made with this equipment.

9a-65. New Wire Fatigue Testing Method. F. A. Votta, Jr. *Iron Age,* v. 162, Aug. 12, 1948, p. 78-81.

A simplified and rapid, yet highly accurate method for obtaining fatigue strength and endurance limit values to serve as quality indexes. Of interest to both the wire manufacturer and consumer, the method is said to make possible production control and material acceptance on the basis of modern statistical methods.

9a-66. Comparative Tests on Creep of a Ring Specimen in Bending and of a Cylindrical Specimen in Tension. (In Russian.) I. A. Oding and S. I. Matveyev. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 595-607.

A special type of ring specimen for the creep test. Shape and dimensions are indicated. Test apparatus, including electrical circuit and a comparison of the data obtained from such specimens with that from the usual type of specimens.

9a-67. A New Method of Determining Plasticity. (In Russian.) U. M. Chizhikov. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 608-613.

A new method of determining the plasticity of ferrous and nonferrous metals in different conditions of deformation. The theoretical bases and the test procedure.

9b—Ferrous

9b-36. Impact Testing of Weldments. William C. Long. *Metal Progress,* v. 54, July 1948, p. 43-45.

Development of special test devices for evaluating the quality of small steel assemblies, electrically butt welded. No correlation was found between impact and tensile-test results. Guillotine-type impact testers now used for production-line inspection of automotive shock-absorber parts.

9b-37. Dynamic Hot Hardness Testing With Special Reference to Isothermal Transformations. George M. Enos, George J. Peer, and James C. Holzwarth. *Metal Progress,* v. 54, July 1948, p. 51-55.

To investigate some irregularities in hardening a die steel, a quick determination of its martensite start point was made by a series of punch marks during air cooling. The method used seemed to have wider utility, hence some trials were made to determine the TTT-curves of two steels with fairly high alloy content. Results on S.A.E. 52100 checked published S-curves and were verified by examination of microstructures.

9b-38. Les essais mecaniques des fontes grises. (Mechanical Testing of Gray Cast Iron.) Jacques Prache. *Fonderie,* v. 28, April 1948, p. 1113-1118.

Different procedures, and use of a simple tensile test on special cast specimens. Author believes that this method gives more precise information than other tests.

9b-39. Application of the Brinell Test in the Foundry. J. Leonard. *Foundry Trade Journal,* v. 85, July 1, 1948, p. 3-5.

Data indicate that the Brinell test may be suitable for evaluating the uniformity of mechanical properties throughout a given ferrous casting. (Exchange paper from the Association Technique de Fonderie de Belgique.)

9b-40. Testing Turbine Wheels. *Aero Digest,* v. 57, Aug. 1948, p. 57.

Method for proving high-test, heat resistant steel alloys by subjecting disks of such materials to centrifugal force of 35,000 r.p.m. and temperature up to 1750° F. High-speed photographs enable engineers to study test wheels as they break.

9b-41. "Eye-Dropper" Method of Testing Steel. *Blast Furnace and Steel Plant,* v. 36, Aug. 1948, p. 976.

Liquid steel fresh from the furnace is drawn up into a tube. The steel hardens into a smooth, homogeneous rod within five minutes, the glass is cracked from it, and the rod is ready to be checked for quality.

9b-42. High Speed Photographs of Water Jet in the End-Quench Test. Robert A. Buchanan. *Metal Progress,* v. 54, Aug. 1948, p. 180-181.

This series of five stroboscopic photographs show the initial stages in end-quenching a red-hot bar of standardized manner.

9b-43. Strain Testing Improves Iron Alloy Machine Parts. H. M. Hardy and T. O. Kuivinen. *Product Engineering,* v. 19, Aug. 1948, p. 116-120.

Investigation made of the possibility of reducing stress concentration at the crankpin fillets of a Meehanite crackshaft designed for a 9 in. bore diesel engine. Investigations on a compressor cylinder, and Meehanite beams.

9b-44. Ubermikroskopische Abbildung von Stahlbruchflächen. (Electron-Microscopic Photographs of Steel Fractures.) Hans Mahl. *Metallforschung,* v. 2, June, 1947, p. 186-188.

Photographing of steel fractures by the impression method and its use in structure examinations.

9b-45. Zur Frage der Prufung und Bewertung der mechanischen Eigenschaften von Sinterwerkstoffen. (Testing and Evaluating the Mechanical Properties of Sintered Materials.) Wilhelm Jung-König and Gunter Wassermann. *Metallforschung,* v. 2. July-Aug. 1947, p. 244-249.

Methods and results of testing the mechanical properties of sintered iron specimens.

9d—Light Metals

9d-6. The Testing of Light Alloy Fusion Welds. *Welding Research,* v. 2 (Bound with *Transactions of the Institute of Welding,* v. 2), June 1948, p. 54r-60r.

Some features of a light-alloy

(Turn to page 30)

A. I. M. E. PROGRAM *(Cont.)*

Tuesday, Oct. 26

6:00 p. m.—Jefferson Room

COCKTAIL PARTY
(For Dinner Guests)

7:00 p. m.—Crystal Room

ANNUAL AUTUMN DINNER

Toastmaster—A. A. Smith, Jr.
Chairman
Institute of Metals Div.

Welcome—Robert M. Brick
Chairman
Philadelphia Section

The Taft-Hartley Act; an Appraisal, by Waldo E. Fisher, professor of industry, Wharton School, University of Pennsylvania.

Wednesday, Oct. 27

12:30 p. m.

POWDER METALLURGY COMMITTEE LUNCHEON

2:00 p. m.—Jefferson Room

DIFFUSION AND SURFACE PHENOMENA

Chairmen—R. Smoluchowski
M. L. Fuller

Diffusion of Carbon in Austenite With a Discontinuity in Composition, by L. S. Darken, U. S. Steel Corp.

An Electron Diffraction Study of Oxide Films Formed on Nickel-Chromium Alloys, by J. W. Hickman and E. A. Gulbransen, Westinghouse Research Laboratories.

An Electron Diffraction Study of Oxide Films Formed on Copper-Nickel Alloys at Elevated Temperatures, by J. W. Hickman and E. A. Gulbransen, Westinghouse Research Laboratories.

Decarburization of Chrome-Nickel Alloys by Their Surface Oxides in High Vacua and at Elevated Temperatures, by E. A. Gulbransen, W. S. Wysong and K. Andrew, Westinghouse Research Laboratories.

2:00 p. m.—Crystal Room

TRANSFORMATION

Chairmen—C. S. Smith
A. R. Troiano

The Effect of Chromium on the Ms Point, by J. B. Bassett and E. S. Rowland, Timken Roller Bearing Co.

The Kappa Eutectoid Transformation in the Copper-Silicon System, by W. R. Hibbard, Jr., G. H. Eichelman, Jr., and W. P. Saunders, Yale University.

Stabilization of the Austenite-Martensite Transformation, by M. Cohen, Massachusetts Institute of Technology, and W. J. Harris, Jr., Naval Research Laboratory.

Secondary Hardening of Tempered Martensitic Alloy Steel, by Walter Crafts and J. L. Lamont, Union Carbide and Carbon Research Laboratories, Inc.

4:00 p. m.—Junior Room, First Floor

MEMBERSHIP COMMITTEE MEETING

Society for Non-Destructive Testing

Eighth Annual Meeting and Convention
Benjamin Franklin Hotel, Philadelphia
Oct. 27 and 28, 1948

Wednesday, Oct. 27

9:30 a. m. to 12 noon

Benjamin Franklin Hotel

Possible Industrial Applications of Soft Radiation—10 to 100 Kilovolts, by E. Dale Trout, General Electric X-Ray Corp.

Installation of and Adjustments to a Mobile Betatron, by Donald T. O'Connor, U. S. Naval Ordnance Laboratory.

Field Processing of Radiographic Films Where Water Supply Is at a Premium, by Royal G. Tobey, Eastman Kodak Co.

Experimental Work Employing Radioisotopes Cobalt and Selenium, by Don M. McCutcheon, Ford Motor Co.

2:00 p. m. to 4:30 p. m.

Benjamin Franklin Hotel

High Speed Cine Radiography, by C. W. Slack and L. F. Ehrke, Westinghouse Electric Corp.

Gamma Radiography of Bronze Castings, by Howard F. Taylor, Massachusetts Institute of Technology.

Radiographic Examination of Abrasive Wheels, by Margaret J. Johnson, Carborundum Co.

Spot Weld Radiography, by Robert C. McMaster, Battelle Memorial Institute.

Thursday, Oct. 28

9:30 a. m. to 12 noon

Benjamin Franklin Hotel

X-Ray Diffraction as a Nondestructive Testing Method of Magnetic Materials, by J. J. Pierce, U. S. Naval Ordnance Laboratory.

New Testing Methods for Ceramic Products, by Carl E. Betz, Magnaflux Corp.

A Universal Exposure Calculator for Radium Radiography, by Noah A. Kahn, Emil A. Imbembo and Jay Bland, New York Naval Shipyard.

2:00 p. m. to 4:30 p. m.

Benjamin Franklin Hotel

1948 MEHL LECTURE

The Supersonic Reflectoscope, an Instrument for Nondestructive Testing and Measuring by Means of Sound Waves, by Floyd A. Firestone, consulting physicist.

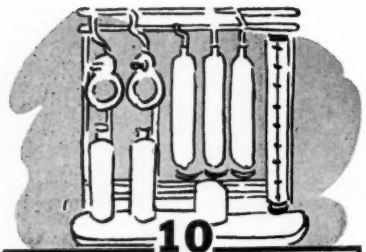
EIGHTH ANNUAL BUSINESS MEETING

Register by Mail and Save Delay!

See page 63 for advance registration form for the National Metal Congress and Exposition. Fill it out, send it to Convention Hall, and your entrance badge will be returned to you by mail.

weld that affect its behavior in testing; tests used in determining the quality of light-alloy welds; selection of test pieces; visual, metallographic, and radiographic examination; hardness testing; tensile tests; and bend tests.

For additional annotations indexed in other sections, see:
3b-112; 4a-37; 27a-108.



10 ANALYSIS

10a—General

10a-58. Develop Chemical Methods for Faster Sand Analysis. R. A. Willey and J. B. Caine. *American Foundryman,* v. 14, July 1948, p. 50-56.

Rapid but accurate methods for loss on ignition, carbon, iron oxide, calcium oxide, sodium oxide, potassium oxide, silica, alumina, and magnesia. Sampling procedure.

10a-59. Automatic Gravimetric Analysis. (Using the Gooch Crucible.) (In French.) Clement Duval. *Comptes Rendus,* (France), v. 226, April 19, 1948, p. 1276-1278.

Further details on a method previously described (v. 224, 1947, p. 1824) in which the loss of weight of the precipitate in a Gooch crucible is followed and recorded by a Chevenard microbalance. Advantages in accuracy and speed. Drying temperatures for various precipitates obtained in analysis of Ag, Ba, Ca, Cs, K, La, Mg, Na, Rb, and Tl.

10a-60. L'Analyse spectrographique dans la metallurgie. (Spectrographic Analysis in Metallurgy.) Joseph Orsag. *Revue de L'Aluminium,* v. 25, May 1948, p. 151-159.

Principles, procedures, and applications.

10a-61. Quinquevalent Molybdenum as a Volumetric Reagent. Part I. Stability of Solutions and Determination of Ferric Iron. Part II. The Titration of Iodate, Bromate, Dichromate and Vanadate. Part III. The Determination of Ceric, Ferric, Dichromate and Vanadate Solutions in Mixtures of Two and Three Together. A. R. Tourky, M. Y. Farah, and H. K. El Shamy. *Analyst,* v. 73, May 1948, p. 258-268.

Experimental potentiometric titration curves. Factors involved. 13 ref.

10a-62. Weighing Spots Impurity. *Science News Letter,* v. 54, Aug. 7, 1948, p. 87.

An electronic device capable of speeding up detection of impurities in metals from a matter of days by chemical methods to 5 to 15 min.

10a-63. Polarographische Kupfer-, Zink- und Manganbestimmung in Aluminium- und Zinklegierungen. (Polarographic Method of Determining Copper, Zinc, and Manganese in Aluminum and Zinc Alloys.) M. Spalenka. *Zeitschrift fur Analytische Chemie,* v. 128, no. 1, 1947, p. 42-51.

A new, rapid and direct method. Results of method. 10 ref.

10b—Ferrous

10b-47. On the Electrometric Determination of Vanadium in Steels. (In English.) A. Claassen and J. Corbey. *Recueil des Travaux Chimiques des Pays-Bas,* v. 67, Jan. 1948, p. 5-10.

In tungsten-free steels, vanadium is determined by titration with ferrous sulphate under specified conditions of acidity. It is shown that this method gives low results due to the incomplete reduction of the vanadophosphatotungstate complex; complete reduction however takes place by boiling with excess ferrous sulphate, enabling the determination to be finished by electrometric titration with standard permanganate. 10 ref.

10b-48. The Determination of Cerium in Cast Iron. W. Westwood and A. Mayer. *Analyst,* v. 73, May 1948, p. 275-282.

Colorimetric methods for determination of small amounts of Ce in plain and alloy cast irons. Interference from alloying elements is encountered only with high Mn irons and highly alloyed irons of the Ni-Resist type. For these materials a preliminary mercury cathode separation is used. The method is not applicable to samples containing more than 0.3%. 14 ref.

10b-49. The Absorptiometric Determination of Chromium in High-Speed Steels by Sodium Chlorate Oxidation. F. E. Eborall, *Metallurgia,* v. 38, July 1948, p. 135-136.

Sodium chlorate is used to oxidize iron, tungsten, carbides and as a quantitative oxidant for chromium. Manganese partially oxidizes to manganese dioxide. Improved decomposition of the carbides is obtained as compared with nitrate oxidation. Tungsten and manganese dioxide are eliminated by filtration. Vanadium, molybdenum, nickel and cobalt can be determined as in the compound method.

10b-50. Beitrag zur Bestimmung oxydischer Einschlusse im Stahl. (Determining Oxide Inclusions in Steel.) Herbert Henkel. *Zeitschrift fur Analytische Chemie,* v. 128, no. 1, 1947, p. 26-41.

Method and results of electrolytic analyses of hardened steels. The silica content in steel is determined by an entirely new method. 12 ref.

10b-51. Method of Determination of the Presence of Carbon in Steel. (In Russian.) U. A. Klyachko and M. M. Shapiro. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 549-555.

Proposes a method of separating free carbon and carbide, using a heavy liquid of specific weight between those of carbon and carbide. The method is tested on tungsten and chromium steel subject to the usual heat treatment.

10b-52. Isolation of Carbide Phases in Stable Condition. (In Russian.) V. M. Popova and M. F. Raebina. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 555-557.

Apparatus for isolation of carbide in stable conditions, and the anodic application of standard steels during continuous removal of the precipitate.

10b-53. Discussion of the Influence of Size and Mass of Specimens on the Results of Spectrographic Analysis of Steels. (In Russian.) V. G. Koritsky and T. B. Edneral. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 558-565.

Decreasing the dimensions of test specimens below standard magnitudes causes progressive error in the spectrographic determination of different elements in steels.

10b-54. Spectral Analysis of Slag. (In Russian.) N. V. Byanov. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 565-570.

The method of Vargina-Sventitsky for determination of traces of iron in sand is applied to the analysis of slags, with a possible error of about 5%. The time of analysis for seven different compounds is 20 to 25 min.

10b-55. Spectral-Analytical Determination of Carbon in Steels and Cast Irons. (In Russian.) K. A. Sukhenko and N. P. Yakovleva. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 625.

Carbon determination by spectral analysis. The conditions of investigation and the results obtained.

10c—Nonferrous

10c-58. Determination of Trace Impurities in High-Purity Magnesium and Calcium. Sydney Abbey. *Analytical Chemistry,* v. 20, July 1948, p. 630-634.

Sensitive photometric methods for trace impurities which have been applied to the analysis of high-purity magnesium, magnesium alloys, and calcium. Mn is determined as permanganic acid, following periodate oxidation; Fe as the thiocyanate complex; Ni as the tetravalent complex with dimethylglyoxime; Cu by CCl_4 extraction of the carbamate complex; and Si by reduction of silicomolybdate to molybdenum blue. 22 ref.

10c-59. 1,2-Cyclohexanedione Dioxime; Reagent for Palladium. Roger C. Voter, Charles V. Banks, and Harvey Diehl. *Analytical Chemistry,* v. 20, July 1948, p. 652-654.

Compound yields a yellow precipitate with divalent palladium which can be used as a qualitative and quantitative reagent for the palladium ion and offers several advantages over its analog, dimethylglyoxime.

10c-60. Rapid Shop Test for Zinc Die Casting Alloys. C. Goldberg. *Metal Progress,* v. 54, July 1948, p. 64.

Simple qualitative spot test.

10c-61. The Colorimetric Determination of Nickel As Ni Dimethylglyoxime. (In English.) K. Ter Haar and W. Westerveld. *Recueil des Travaux Chimiques des Pays-Bas,* v. 67, Feb. 1948, p. 71-81.

Method in which persulphate is used as an oxidizing agent. Effects of other metallic ions were determined. The method is extensively applied in the authors' laboratory to the determination of Ni in chromium-iron, and in Mo and W compounds.

10c-62. Investigation of the Influence of the Composition of the Sample on the Intensity of Spectral Lines During Spectrographic Analysis of Minerals. (In Russian.) S. A. Borovik and T. F. Borovik-Romanova. *Izvestiya Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk* (Bulletin of the Academy of Sciences of the U.S.S.R, Section of Chemical Sciences.), no. 2, March-April 1948, p. 161-164.

Results of investigations of the influence of Na and K salts on the intensity of lines of neutral and ionized atoms of Li, Rb, Ti, and V when different sources of exitation were used (d.c. and a.c. arcs, spark according to the Feisher method, and acetone flames).

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Exhibitors in National Metal Show

Convention Hall, Philadelphia

Oct. 25, 26 and 27, Noon to 10:00 p. m.

Oct. 28 and 29, 10:00 a. m. to 6:00 p. m.

Acetogen Gas Co., Detroit 11. Booth A-1549. Torches, tips, welding and hardening equipment.

Acme Mfg. Co., Detroit. Booth 618. Grinding, polishing, buffing and deburring machines.

Acme Steel Co., Chicago 8. Booth 737. Acme-Morrison metal stitchers.

Acme Tool Co., New York 7. Booth 1909. Surface plates; parallels; straightedges; toolholders.

Air Reduction Sales Co., New York 17. Booth 1845. Gas welding and cutting equipment; flux-injection cutting equipment; helium welding.

Ajax Electric Co., Philadelphia 23. Booth 645. Salt bath heat treating and aluminizing furnaces.

Ajax Electrothermic Corp., Trenton 5, N. J. Booth 645. Induction heating and melting equipment.

Ajax Engineering Corp., Trenton 7. Booth 645. Induction melting furnaces.

Alan Wood Steel Co., Conshohocken, Pa. Booth 1809. Billets, blooms and slabs; sheet and plate.

Alden Welding Supplies, Inc., Philadelphia. Booth A-1567. Welding distributors.

Allison Co. Booth 705. Abrasive cutting wheels.

Alloy Rods Co., York, Pa. Booth 345. Arc welding electrodes.

Alvey-Ferguson Co., Cincinnati 9, Ohio. Booth 1819. Parts washing machines; conveyer systems.

American Brake Shoe Co., New York 17. Booth 126. Heat and corrosion resistant castings; cast iron; steel forgings.

American Brass Co., Waterbury 88, Conn. Booth 337. Copper alloy sheet, wire, rod, tubing and other shapes; welding rods.

American Chain & Cable Co., Inc., Bridgeport 2, Conn. Booth 116. (See Campbell Machine Division and Wilson Mechanical Instrument Co.)

American Chemical Paint Co., Ambler, Pa. Booth 1654. Surface treating chemicals; metal protective coatings.

American Cladmetals Co., Carnegie, Pa. Booth 124. Rosslyn metal sheets; commercial and domestic food processing ware.

American Emblem Co., Utica 1, N. Y. Booth 1729. Nameplates, insignia, emblems, embossed metal stampings.

American Gas Association, New York 17. Booth 1301. Industrial gas applications.

American Gas Furnace Co., Elizabeth B, N. J. Booth 1509. Heat treating furnaces; gas burners.

American Institute of Bolt, Nut & Rivet Manufacturers. Cleveland 15. Booth 1564. Locknuts.

American Manganese Steel Co., Chicago Heights, Ill. Booth 126. Hard surfacing and reclamation welding products.

American Metal Market Co., New York 7. Booth 1918. Copies of *American Metal Market.*

American Non Gran Bronze Corp., Berwyn, Pa. Booth 1767. Precision machined aircraft engine and propeller parts; bronze castings; Ni-Resist, cast iron and beryllium machined parts.

American Smelting & Refining Co. Booth 231. (See Federated Metals Div.)

American Society for Metals, Cleveland 3. Booth 241. Technical magazines, books and educational services.

American Society for Metals, Philadelphia Chapter. Booth A-1554.

Anderson Oil Co., F. E., Portland, Conn. Booth 1629. Metalworking and rust preventive oils; metal cleaners.

Applied Hydraulics. Booth 440. (See Industrial Publishing Co.)

Arcos Corp., Philadelphia 43. Booth 144. Arc welding electrodes; oxy-arc cutting process.

Army Industrial and Recruiting Display, Philadelphia. Booth 1357. Army supplies and ordnance items.

Aronson Machine Co., Arcade, N. Y. Booth 1963. Positioners for welding, spray painting, sandblasting, assembly work and grinding; belt sanders.

Arwood Precision Casting Corp., Brooklyn 1, N. Y. Booth 1427. Precision investment castings, ferrous and nonferrous.

Atkins & Co., E. C., Indianapolis 9. Booth 831. Hacksaw blades.

Audubon Wire Cloth Corp., Philadelphia. Booth 1545. Wire cloth and mesh.

Austenal Laboratories, Inc., New York 16. Booth 1428. Microcastings made in high-temperature alloys, low alloys, S.A.E. and N.E. steels and toolsteels.

Auto Arc-Weld Mfg. Co., Cleveland 4. Booth 1765. Automatic arc welding head and wire.

Automatic Temperature Control Co., Inc., Philadelphia 44. Booth 104. Time controls and motorized valves.

Automotive Industries, Philadelphia 39. Booth 1959. Publications.

B

Baker & Co., Inc., Newark 5, Booth 1853. Industrial and laboratory furnaces; purifiers and dryers.

Baldwin Locomotive Works, Philadelphia 42, Booth 1620. Universal testing machines; tensile, fatigue and impact machines; SR-4 load cell; extensometers.

Bastian-Blessing Co., Chicago 30, Booth 1816. Regulators, valves, manifolds, fittings for high-pressure gases.

Bath & Co., Cyril, Cleveland, Booth 1520. Contour formers; presses; dies and tools.

Battelle Memorial Institute, Columbus 1, Ohio. Booth 1754. Research facilities.

Bausch & Lomb Optical Co., Rochester 2, N. Y. Booth 310. Research metallographs; metallurgical and shop microscopes.

Bellis Heat Treating Co., Brantford, Conn. Booth 1356. Heat treating equipment and supplies.

Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio. Booth 817. Air controls for clamping, positioning, holding.

Black Drill Co., Cleveland 17, Booth 656. Drills for hardened steels.

Blakeslee & Co., G. S., Chicago 50, Both 1762. Solvent degreasers and metal parts washers.

Brown Instrument Co., Phiiladelphia 44, Booth 203. Potentiometers; controllers; thermometers.

Brush Beryllium Co., Cleveland 3, Booth 906. Beryllium metal, alloys and products.

Bryant Heater Co., Cleveland 10, Booth 1315. Gas combustion equipment; burners; mixers; blowers.

(*Turn to page* 33)

10c-63. Neues Verfahren zur titrimetrischen Bestimmung des Mangan II- und des Cadmium Ions. (New Titrimetric Method of Determining Manganese II and Cadmium Ions.) Hugo Krause. *Zeitschrift fur Analytische Chemie*, v. 128, no. 1, 1947, p. 18-23.

The method of titrimetrically determining manganese II and cadmium ions by precipitating the compounds $NH_4MnPO_4 \cdot H_2O$ and $NH_4CdPO_4 \cdot H_2O$, respectively.

10c-64. Polarographic Determination of Zinc and Nickel in Aluminum Alloys. (In Russian.) Z. S. Mukhina. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 522-527.

A method for determination of zinc, from 0.03 to 10% or more, in aluminum alloys. A 10% solution of ammonium chloride, sodium sulphide, and ammonia, with dextrin added for maximum suppression, is recommended.

10c-65. A New Variation of the Cyanic Method of the Determination of Molybdenum. (In Russian.) L. B. Ginzburt and U. U. Lurye. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 538-545.

A new variation of the cyanic method of photocolorimetric determination of molybdenum, with applications as a reducing agent for potassium iodide. This does not differ from the old method in application to stannous chloride, in respect to degree of sensitivity and range of colorimetry, but does differ in having a shorter period of coloration and in degree of stability.

10c-66. Determination of Iron, Silica, Copper, and Zinc in Aluminum by the Spectrographic Method. (In Russian.) L. V. Drutskaya. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 571-575.

The application of spectral analysis for the determination of metals listed. Apparatus used. Calibration curves for metals. This analysis assumes a maximum error of 12%.

10c-67. Direct Polarographic Determination of Copper and Lead in a Nickel Electrolyte. (In Russian.) I. A. Korshunov and L. N. Sazanova. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 621.

Polarographic determination of copper and lead in a nickel electrolyte previously treated with small amounts of hydrogen peroxide and sodium to destroy organic conditions and cause iron to precipitate.

10c-68. Polarographic Determination of Zinc in a Piston Alloy. (In Russian.) I. A. Korshunov and I. I. Malyugina. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 622.

The main characteristic of the proposed method is the use of an alkaline solution, permitting the desired determination without aluminum separation.

10d—Light Metals

10d-18. Méthodes d 'analyse de l 'aluminum. (Methods of Aluminum Analyses.) *Revue de L 'Aluminium*, v. 25, June 1948, p. 196-200.

Latest standard procedures for sample preparation and for accurate determination of Si, Fe, Cu, Mn, Mg and Zn in Al are presented. (To be continued.)

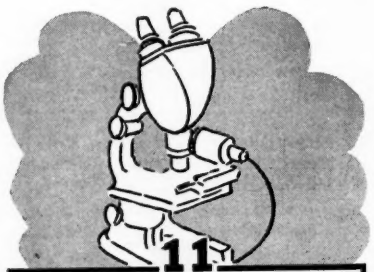
10d-19. Rapid Volumetric Method of Determination of Magnesium in Aluminum Alloys. (In Russian.) R. B. Glushkina. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 624.

For the determination of magnesium without preliminary separation of manganese, the author proposes the use of citric acid, which shoots into the stable complex the ions of aluminum, iron, and manganese. The ions of magnesium do not produce a complex with citric acid and could be precipitated with ammonium hypophosphate.

10d-20. Rapid Determination of Small Amounts of Silicon in Magnesium Alloys. D. F. Phillips and S. E. Hermon. *Metallurgia*, v. 38, July 1948, p. 179-180.

A method for the gravimetric estimation of small amounts of silicon in aluminum alloys. This is adapted to the satisfactory determination of the same element in magnesium alloys.

For additional annotations indexed in other sections, see: 27d-13.



11 APPARATUS, INSTRUMENTS and METHODS

11-193. A Mains Operated Valve Voltmeter for the Measurement of Secondary Current in Resistance Welding Machines. A. J. Hipperson. *Welding Research*, v. 2 (Bound with *Transactions of the Institute of Welding*, v. 2), June 1948, p. 40r-42r.

Development, construction, and calibration of this voltmeter. Use is confined to the measurement of the magnitude of sinusoidal current, since its operation is fundamentally dependent upon the relationship between the peak value and the R. M. S. value of a sinusoidal wave train. Current controlled by the phase-shift method cannot be measured.

11-194. Pore Size Distribution in Porous Materials; Interpretation of Small-Angle X-Ray Scattering Patterns. H. L. Ritter and L. C. Erich. *Analytical Chemistry*, v. 20, July 1948, p. 665-670.

The theory as developed by Guinier was applied simply and approximately to porous aggregates and results are reduced to continuous distributions of pore size. A method for inversion of the Guinier integral under certain simplifying assumptions and a simple semi-empirical method of making the correction for a finite collimating system. Results are correlated with data from adsorption measurements and from the mercury porosimeter. 16 ref.

11-195. An Improvement in Lead Laps. Walter H. Bruckner. *Metal Progress*, v. 54, July 1948, p. 63.

The author encountered some difficulties with the serrated cast-iron plate used to work the abrasive into the lead lap, since corrosion products also became embedded. Use of "Type 2B Ni-Resist" eliminated the trouble.

11-196. Chromatic Aberration of Resolving Power in Electron Microscopy. E. G. Ramberg and J. Hillier. *Journal of Applied Physics*, v. 19, July 1948, p. 678-682.

Calculations of the effect of chromatic aberration and diffraction show that with an objective aperture smaller than the "optimum aperture", and centered optics, such inhomogeneities do not appreciably affect the resolution, even in the extreme case that the electrons are uniformly distributed in energy.

11-197. X-Ray, Electron, and Neutron Diffraction. C. G. Shull and E. O. Wollan. *Science*, v. 108, July 23, 1948, p. 69-75.

Some comparisons of results which can be obtained by these three techniques; their advantages and disadvantages in particular applications.

11-198. Sharp Edges; Determination of Their Dimensions. J. Ferdinand Kayser. *Iron and Steel*, v. 21, July 1948, p. 325-328.

Methods used. Thickness of extreme edge of sharpest wafer-blades is less than about half a micron. Application to edged tools and other sharp articles.

11-199. Cathode-Ray Magnetization Curve Tracer. M. V. Scherb. *Review of Scientific Instruments*. v. 19, July 1948, p. 411-419.

An instrument developed to measure the magnetic properties of materials in a variety of forms by oscillographic techniques. Magnetic hysteresis loops can readily be obtained for specimens in rod, powder, tape, or wire form having cross-sectional areas as small as 10^{-5} sq. cm. or as large as 0.3 sq. cm. With slight modifications, the instrument can be adapted to magnetic measurements of materials as a function of frequency, temperature, tension, torsion, or pressure. 10 ref.

11-200. Ultrasonics Miscellany. H. Manley. *Discovery*, v. 9, July 1948, p. 212-216.

Application of radiations having same velocity as sound but a greater frequency and consequently shorter wave length. Methods for producing ultrasonics and use in detecting flaws in metal, interspersion of two metals which are not mutually soluble, such as lead-iron or tungsten-iron, and heating.

11-201. Residual Stress Analysis of Overspeeded Disk With Central Hole by X-Ray Diffraction. James N. Good. *National Advisory Committee for Aeronautics, Research Memorandum* No. E8E11, July 23, 1948, 30 pages

Methods and results of an X-ray diffraction analysis of residual surface stresses after plastic strain was introduced in a parallel-sided 3S-O aluminum disk with a central hole by two types of centrifugal overspeed.

11-202. Recent Developments in Surface Measurement. Allen G. Gray. *Products Finishing*, v. 12, Aug. 1948, p. 70, 72, 74, 76, 78, 80.

Methods and equipment.

11-203. A Method for Measuring Wear. *Production Engineering & Management*, v. 22, Aug. 1948, p. 54.

Investigations conducted at the National Bureau of Standards led to the adaptation of a diamond indentation method of measuring wear. A sensitive measuring instrument developed to measure extremely small increments of wear, as little as one hundred-thousandth of an inch under favorable conditions.

11-204. Compensating Pyrometer for a Moveable Thermocouple (In Russian.) B. D. Katsnelson and V. V. Pomerantsev. *Kotloturbostroenie* (Boiler and

(Turn to page 34)

EXHIBITORS

Buehler Ltd., Chicago 1, Booth 441. Sample preparation equipment for the metallurgical laboratory; microtesting machines; optical equipment.

Butler Cylinder Gas Co., Reading, Pa. Booth A-1567. Welding distributors.

By-Products Steel Co. Division, Coatesville, Pa. Booth 320. (See Lukens Steel Co.)

C

Campbell Machine Div., American Chain & Cable Co. Inc., Bridgeport 2, Conn. Booth 116. Abrasive cutting machines; nibbling machines.

Cambridge Wire Cloth Co., Cambridge, Md. Booth 1424. Wire cloth and screening; metal mesh conveyor belts.

Carbomatic Corp., Astoria, L.I. Booth 1302. Gas-burning infrared generators for paint drying ovens.

Carlin Co., J. A., Bala-Cynwyd, Pa. Booth 1657 and 1658. Presses and machine tools.

Cherry Rivet Co., Los Angeles 13, Booth 742. Blind rivets; riveting tools.

Chilton Co., Philadelphia 39, Booth 1959. Publications (*Automotive Industries*).

Cincinnati Milling & Grinding Machines, Inc., Cincinnati 9, Booth 1510. Flame hardening machine; machine tools.

Cities Service Oil Co., New York 5, Booth 402. Cutting and grinding oils; drawing compounds; greases.

Cleveland Punch & Shear Works Co., Cleveland 14. Booth 1733. Inclinable open-back presses; drum-type friction clutch.

Clinton Machine Co., Clinton, Mich. Booth 1836. Electrical machine for piercing hard metals.

Colonial Alloys Co., Philadelphia 29. Booth 1662. Finishing of aluminum.

Commander Manufacturing Co., Chicago 24, Booth 941. Drilling heads and tappers.

Commerce Pattern and Foundry Co. (See Upton Electric Furnace Division.)

Continental Industrial Engineers, Inc., Chicago 3. Booth 145. Industrial furnaces, production lines, special machines.

Crane Packing Co., Chicago 13. Metallic packings; mechanical seals.

Crystal Lake Grinders, Crystal Lake, Ill. Booth 1562. Cylindrical and surface grinders.

D

Delaware Tool Steel Corp., Wilmington 99, Del. Booth 121. Heat-treating furnaces; toolsteel.

Delta File Works, Inc., Philadelphia 37. Booth 1332. Hand files; rotary power files.

DeSanno & Son, Inc., A. P. Philadelphia 2. Booth 1362. Grinding wheels; abrasive points; cut-off machines.

Despatch Oven Co., Minneapolis 14. Booth 1415. Ovens; heat treating furnaces; heaters.

Detroit Mold Engineering Co., Detroit. Booth A-1562. Equipment for plastic molding.

Detroit Testing Machine Co., Detroit 13. Booth 1830. Tensile and ductility testers; Brinell machines.

Die Castings. Booth 440. (See Industrial Publishing Co.)

Dietert Co., Harry W., Detroit 4. Booth 208. Carbon and sulphur determination equipment; Brinell reader; sand, core and mold testing equipment for the foundry.

Distillation Products, Inc., Rochester 13, N. Y. Booth 1909. Vacuum systems, gages, furnaces.

Diversey Corp., Chicago 4. Booth 1815. Soak tank cleaner.

Donovan Co., Philadelphia 22. Booth 844. Heat treating equipment and services.

Dow Chemical Co., Midland, Mich. Booth 416. Magnesium; magnesium alloy products.

(*Turn to page* 35)

A Thousand Improvements a Year!

We at Ryerson believe that constant improvement in every operation is the key to good steel-service. We continually invent, revamp, revise, reorganize—*improve*. Best of all, our employees help show us the way.

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PRINCIPAL PRODUCTS: BARS—Carbon and alloy, hot rolled and cold fin., reinforcing; STRUCTURALS—Channels, angles, beams, etc.; PLATES—Sheared and U.M., Inland 4-Way Floor Plate; SHEETS—Hot and cold rolled, many types and coatings; TUBING—Seamless and welded, mechanical and boiler tubes; STAINLESS—Allegheny sheets, plates, tubes, etc.; MACHINERY & TOOLS—for metal working.

RYERSON STEEL

Turbine Manufacture), Jan.-Feb. 1948, p. 29-31.

Construction of the above for the measurement of gases in a chamber. The theoretical basis for the apparatus, the validity of these principles, and the accuracy of the operation at high temperatures.

11-205. A Method of Measuring Lateral Pressure During the Pressing of Samples of Powder Metallurgy. (In Russian.) V. N. Goncharova. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 575-578.

Lateral pressure during the pressing of samples of powder metals is determined according to the deformation of the mold, which indicates the forces operating laterally in the mold. Formulas for this computation and for the computation of the toughness of the mold.

11-206. Application of Conic Impression to the Study of the Rate of Resistance to Deformation of Metals. (In Russian.) F. F. Vitman, N. N. Davidenkov, N. A. Zlatin, and B. S. Ioffe. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 579-594.

Proposes a new method of determining the characteristic mechanical strength of metal. This method consists of the analysis of the field of deformation induced by a cone and of the selection of criteria of the rate of deformation. The theoretical bases, procedure, mathematical computations. 12 ref.

11-207. Multiple Differential Thermal Analysis. Paul F. Kerr and J. L. Kulp. *American Mineralogist,* v. 33, July-Aug. 1948, p. 387-419.

Equipment is designed to further increase the utility of this method. Through the use of standard recording devices in circuit with multiple units, six differential thermal curves may be obtained simultaneously. This arrangement makes it possible to secure a large number of determinations in a short time —18 curves in an 8-hour day. 15 ref.

For additional annotations indexed in other sections, see:
9a-64; 9b-44.

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1229 Wrightwood Ave., Chicago 14, U.S.A.

12 INSPECTION and STANDARDIZATION

12a—General

12a-75. Gauging of Precision Screw Threads. (Continued.) A. C. Pruliere. *Microtechnic,* v. 2, April 1948, p. 71-78. Translated from the French.

Zeiss measuring prism method, optical method, optical-mechanical method, and wire method. (To be continued.)

12a-76. Resonant Frequency as a Means of Inspection. Edward Epremian. *Metal Progess,* v. 54, July 1948, p. 64.

Method of striking with a hammer and listening to find out whether the object "rings true" is replaced by using a tachometer, coil magnet, or oscilloscope to measure the frequency of a part which can be vibrated.

12a-77. The Value of Scientific Inspection to Industry. William Hitt. *Western Machinery and Steel World,* v. 39, July 1948, p. 108-113; discussion, p. 113.

Use of Zyglo, fluoroscopic, and magnaflux inspection.

12a-78. Radiographic Practice at Ford. David Goodman. *Iron Age,* v. 162, July 22, 1948, p. 90-94.

X-ray techniques used for inspection, process development, applied physics research, and other purposes. The success of radiography in reduction of costs and the use of X-ray and electron diffraction in studying surface stresses.

12a-79. Economic Aspects of Radio-Frequency Heating. Lawrence M. Duryee. *Electrical Engineering,* v. 67, Aug. 1948, p. 747.

A condensation.

12a-80. The Proficorder—An Instrument for Recording Waviness and Other Surface Profiles. E. J. Abbott and Edward Rupke. *Transactions of the American Society of Mechanical Engineers,* v. 70, May 1948, p. 263-269; discussion, p. 269-270.

The instrument reproduces, with appropriate magnifications, the actual profile of a considerable length of surface. It permits the study of individual irregularities as to size, shape, and relative position with respect to other irregularities.

12a-81. Radiographic Control of Welded Repairs in Steel Castings. R. Halmshaw, *Welding,* v. 16, July 1948, p. 284-290.

Application of radiographic inspection to castings both for detection of defects and control of subsequent repair by welding. Techniques involved for examination and elimination of flaws encountered. Arguments for and against use of gamma-radiography in this type of work.

12a-82. Line Weld Checking with Portable X-Ray Unit. Elton Sterrett. *World Oil,* v. 128, Aug. 1948, p. 195-196, 200-201.

Development of a mobile unit for transporting an X-ray tube within a line pipe and its use in accurate checking of the entire circumference of a weld. Provides any desired degree of completeness in determining the joining abutting joints of pipe.

12a-83. Better Production Control With Electronic Inspection. Alexander Maxwell. *Production Engineering & Management,* v. 22, Aug. 1948, p. 63-66.

Caging, sorting and segregation of workpieces at speeds up to 20,000 parts per hour is practical with high-frequency electronic equipment with assured accuracy of ±0.00001 in.

12a-84. Standards for Magnetic Particle Inspection. Donald E. Roda. *Iron Age,* v. 162, Aug. 12, 1948, p. 82-89.

Fundamental concepts upon which acceptance and rejection of parts should be based. The two principal types of defects, cracks and inclusions, are discussed as to cause and effect, means of identification under magnetic inspection, and metallographic examination. A listing of nine classifications into which inspection standards are grouped in the aircraft industry, supplemented with a photographic study illustrating the various classifications.

12a-85. Some Crack Detection Methods. Horace Manley. *Metallurgia,* v. 38, July 1948, p. 165-168.

Most important nondestructive methods developed and applied for the detection of internal flaws in ingots, forgings, castings and other metal products.

12a-86. Gaging Three-Fluted Tools. Ernest Fiedler. *Screw Machine Engineering,* v. 9, Aug. 1948, p. 34-35.

12b—Ferrous

12b-45. Tentative Hardenability Bands, 4620 H to 6150 H. *Metal Progress,* v. 54, July 1948, p. 64-B.

A series of charts.

12b-46. Comparative Tool Steel Brands. *Iron Age,* v. 162, July 29, 1948, p. 79-81.

Tables list comparable trade names of toolsteels of 16 producers. Classifications used are the new A.S.M. classifications, (see page 656, 1948 "Metals Handbook"), with the exception of the carbon toolsteel grade.

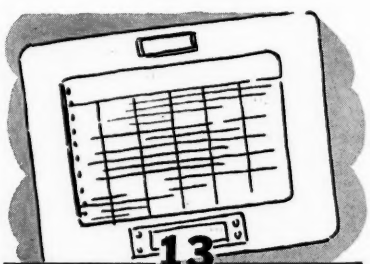
12b-47. Machine Screw Taps. *American Machinist,* v. 92, July 29, 1948, p. 127.

Standards for regular and spiral-pointed tabs.

12b-48. Magnetic Particle Inspection in Engineering. Donald E. Roda. *Iron Age,* v. 162, Aug. 5, 1948, p. 79-83.

The important role played by magnetic inspection as a supplement to other testing procedures in the quality control of aircraft components and weld sections. A description of the equipment used and of the methods followed in detecting various types of defects is presented and the need for establishment of inspection standards emphasized. A convenient method for recording results of magnetic inspection tests.

For additional annotations indexed in other sections, see:
20a-302.



13 TEMPERATURE MEASUREMENT and CONTROL

13-31. A High Temperature Control Circuit. Bruce C. Lutz and John H. Wood. *Canadian Journal of Research,* v. 26, sec. A, May 1948, p. 145-148.

An electronic circuit useful in the control of electric air-bath furnaces having a long time lag. It will control temperatures over 1000° C. within a precision of ± 2°C. over any desired length of time.

13-32. The Calibration of a Thermocouple. A Taylor. *Journal of the Birmingham Metallurgical Society,* v. 28, June 1948, p. 85-96; discussion, p. 97-99.

Fundamental principles of temperature measurement, followed by ap-

(Turn to page 36)

EXHIBITORS

Dreis & Krump Mfg. Co., Chicago. Booth 718. Sheet and plate metalworking equipment; press brakes.

Drever Co., Philadelphia 34. Booth 1653. Heat treating furnaces.

Drexel Institute of Technology, Philadelphia. Booth A-1558. Educational facilities.

Driver Co., Wilbur B., Newark, N. J. Booth 1810. Heat and corrosion resistant alloys; wire, ribbon and strip.

Du Pont de Nemours & Co., E. I., Wilmington, Del. Booth 1665. Cleaning and finishing equipment and supplies.

E

East Shore Machine Products Co., Cleveland 10. Booth 756. Pumps and broaches.

Ecco High Frequency Corp., North Bergen, N. J. Booth 1467. High-frequency induction heating equipment.

Eclipse Fuel Engineering Co., Rockford, Ill. Booth 1410. Industrial gas burners and furnaces.

Edgcomb Steel Co., Philadelphia 34. Booth 109. Carbon tool and stainless steels; welding wire, aluminum; brass.

Electric Furnace Co., Salem, Ohio. Booth 221. Gas-fired, oil-fired and electric heat treating furnaces; controlled atmosphere equipment.

Electric Hotpack Co., Inc., Philadelphia 35. Booth 1763. High-temperature electric furnaces; baths; ovens.

Electro Alloys Division, American Brake Shoe Co., Elyria, Ohio. Booth 126. Heat and corrosion resistant castings; furnace parts.

Elge Associates, New York. Booth 1454. Welding machines; all-purpose shear.

Engelhard, Inc., Charles, East Newark, N. J. Booth A-1561. Atmosphere indicator, CO_2 analyzer and recorder; thermocouples.

Eutectic Welding Alloys Corp., New York 13. Booth 1633. Welding rods and electrodes.

F

Fansteel Metallurgical Corp., North Chicago, Ill. Booth 101. Tungsten, tantalum, columbium and molybdenum metals; welding electrodes and alloys.

Federated Metals Division, American Smelting & Refining Co., New York 5. Booth 231. Aluminum, brass and bronze ingots; bearing alloys; solder; die casting alloys.

Ferner Co., R. Y., Boston 48. Booth 1927. Scientific instruments; laboratory equipment.

Finishing Publications, Inc., New York 18. Booth 603. Copies of *Metal Finishing* and *Organic Finishing.*

Flow. Booth 440. (See Industrial Publishing Co.)

Foote Mineral Co., Philadelphia 44. Booth 1554. Chemicals and minerals; powder metals and alloys; zirconium.

Fostoria Pressed Steel Corp., Fostoria, Ohio. Booth 1558. Assembly methods; infrared heating; industrial lighting.

Foundry. Booth 1744. (See Penton Publishing Co.)

Frankford Arsenal. (See Army Industrial and Recruiting Display.)

Frontier Bronze Corp., Niagara Falls, N. Y. Booth 316. Bronze, aluminum and monel sand castings; aluminum alloy tubing, extrusions and pipe wrenches.

G

Gamma Scientific Co., New York 16. Booth A-1563. Metallurgical microscopes; sample preparation equipment; laboratory supplies.

Gardner Publications, Cincinnati. Booth 1345.

Gas Appliance Service, Inc., Chicago 14. Booth 1310. High-speed heating unit; gas-air mixture; burners; air heaters.

Gehnrich & Gehnrich, Inc., Woodside, L. I. N. Y. Booth 1307. Heat treating ovens.

General Alloys Co., Boston 27. Booth 204. Heat and corrosion resistant castings and furnace parts.

General Controls Co., Glendale 1, Calif. Booth 1346. Automatic pressure, temperature and flow controls.

General Electric X-Ray Corp., Milwaukee 14. Booth 246. Industrial X-ray and radiographic equipment.

Goodrich Co., B. F., Akron, Ohio. Booth 638. Rivnut blind fasteners.

Griffiths-Raguse & Co., Inc., Philadelphia 32. Booth 1657. Grinding wheels; electric tools; brushes; saw blades; sanders.

Gulf Oil Corp., Pitsburgh 30, and Philadelphia 2. Booth 1616. Petroleum products — lubricants, cutting and quenching oils.

H

H & H Research Co., Detroit 26. Booth 1909. Reciprocating action tools and accessories; surface plates; toolholders.

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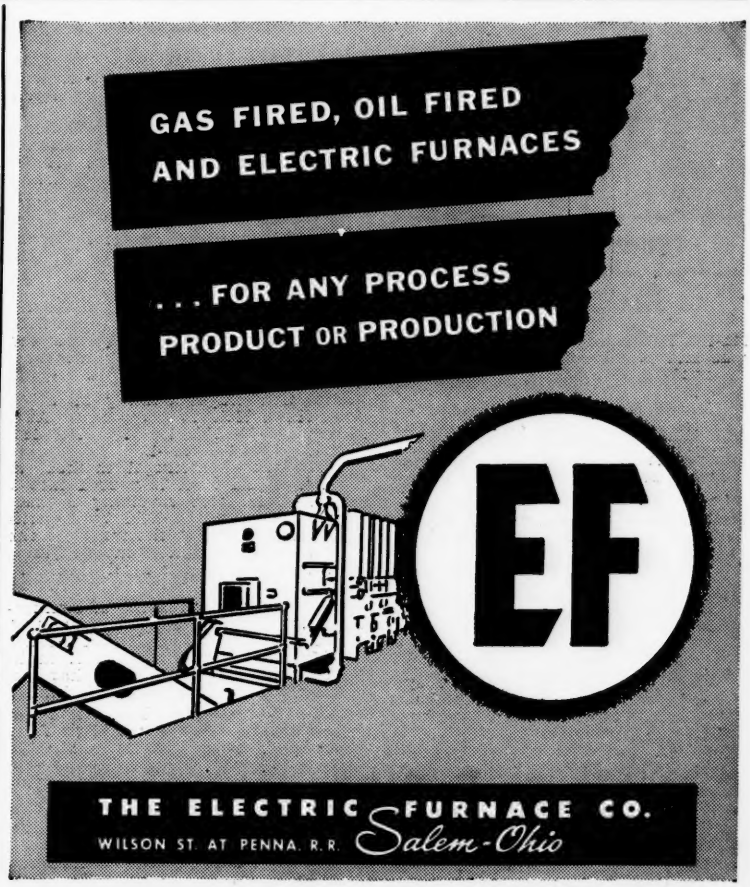


paratus and procedures for calibrating various types.

13-33. Pyrometry and Its Application in the Porcelain Enameling Industry. *Industrial Heating,* v. 15, July 1948, p. 1136, 1138. Based on talk by John R. Green.

New applications of modern pyrometry in porcelain enameling processes.

13-34. A Multi-point Furnace Control Panel. C. L. M. Cottrell. *Metallurgia,* v. 38, July 1948, p. 132-134.

When several furnaces are installed and only a few may be in use simultaneously, it is economical to group together a small number of controlling and recording instruments so that any furnace which is to be used can be easily connected to any one of the instruments. A method of achieving this.

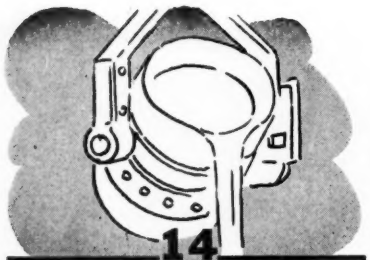
13-35. Determination of Temperature According to the Indications of a Platinum Resistance Thermometer. (In Russian.) B. I. Pilipchuk. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 631.

A method of computing temperatures on the basis of data obtained.

13-36. A New Thermocouple Constructed of Tungsten and Graphite. (In Russian.) P. A. Shchukin and L. V. Pegushina. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 13, July 1948, p. 632-633.

For very high temperatures.

For additional annotations indexed in other sections, see:
20b-59.



14a—General

14a-130. Permanent Mold Castings-Ferrous and Nonferrous. Herbert Chase. *Materials & Methods,* v. 28, July 1948, p. 75-86.

Materials & Methods manual includes production methods and equipment; material selection; dimensional tolerance; production conditions affecting design; and design rules.

14a-131. Mass Production of Precision Castings. *American Foundryman,* v. 14, July 1948, p. 46-49.

The methods and equipment used.

14a-132. Foundry Sand Reclamation. J. M. Cummings and W. M. Armstrong. *Canadian Metals & Metallurgical Industries,* v. 11, July 1948, p. 24-26, 39-40.

Development of a low cost system for small foundries on the basis of a study of the present methods and on experimental investigation of a wet-scrubbing process.

14a-133. How to Prepare Metals for Precision Casting. A. K. Higgins. *Steel,* v. 123, Aug. 2, 1948, p. 88-90.

Answers to some of the more pressing problems encountered in establishing efficient melting practice.

14a-134. Facing Sand Without Coal Dust. R. G. Bate. *Foundry Trade Journal,* v. 85, July 1, 1948, p. 6.

Experiences with a foundry sand compounded without coal dust.

14a-135. Mechanization for the Small Foundry. A. W. Gregg. *Foundry,* v. 76, Aug. 1948, p. 68-73, 142, 145.

Materials-handling equipment and advantages to be derived from mechanization.

14a-136. Precision Investment Casting at Allis-Chalmers. *Foundry,* v. 76, Aug. 1948, p. 78-81, 248, 250, 252.

14a-137. Matchplates Made From Plastic. *Foundry,* v. 76, Aug. 1948, p. 122, 124.

Method used for making them.

14a-138. Designing and Rigging for Core Blowing. H. J. Jacobson. *American Foundryman,* v. 14, Aug. 1948, p. 41-45.

Various aspects of subject and suggestions regarding best design, and material and technique to be used for a core box of average size and shape.

14a-139. Centrifugal Casting; Calculations and Feeding Pressures. W. A. Spindler. *American Foundryman,* v. 14, Aug. 1948, p. 57-58.

Simple equations for various phases of centrifugal casting. In addition to clarifying the mathematics of the process, the three active feeding pressures are examined relatively. Centrifugal casting speeds.

14a-140. Centrifugal Process Improves Investment Castings. Vincent S. Lazzara. *American Machinist,* v. 92, Aug. 26, 1948, p. 93-96.

Process in which plastic patterns replace wax. No shrinkage allowances are required and many alloys are cast to finished size.

14b—Ferrous

14b-87. Gueuses et gueusets. (Pig Iron and Small Pig Iron). Guy Henon and Eraldo Guenzi. *Fonderie,* v. 28, April 1948, p. 1119-1123.

Use of casting machines producing pig-iron billets about 30-lb. size is said to eliminate a series of defects generally present in the finished products when ordinary pig iron (cast in sand molds) is used.

14b-88. A Substitute Fuel for Cupola Use. W. J. Reagan and C. C. Wright. *Foundry,* v. 76, Aug. 1948, p. 74-75, 138, 141-142.

Experiences in use of anthracite for commercial cupola operation, including cost data. Methods for temperature and fluidity measurement.

14b-89. Centrifugal Casting of Steel. John Howe Hall. *Foundry,* v. 76, Aug. 1948, p. 76-77, 176, 178, 180, 182, 184, 186, 188, 190, 193, 197-198.

The true centrifugal method, in which liquid steel is poured into a cylindrical mold revolving so fast that the metal is held by centrifugal force against the inside of the mold, and solidifies into a tube, without use of a central core. (To be continued.)

14b-90. Continuous Casting of Semifinished Steel. T. W. Lippert. *Iron Age,* v. 162, Aug. 19, 1948, p. 72-80, 159-161.

Method of casting steel from liquid phase to semifinished shape, in one simple, inexpensive machine.

14b-91. Large-Scale Production of Miscellaneous Castings in High Duty Grey Iron. *Nickel Bulletin,* v. 21, May 1948, p. 62-65.

Foundry methods and production problems.

14c—Nonferrous

14c-46. Die-Casting Dies; Special Tools and Appliances for Proving New Dies. W. M. Halliday. *Metal Industry,* v. 73, July 16, 1948, p. 43-47.

A number of fixtures for facilitating the toolmaking, setting, mounting, and die-handling operations which arise during the testing of new die-casting dies.

14c-47. Permanent Mold Casting of Copper Base Alloys. James L. Erickson. *Iron Age,* v. 162, July 22, 1948, p. 84-89.

A comprehensive review of current British practice with particular emphasis on mold material and mold coatings. Composition and physical properties of the more commonly used alloys, as well as melting and casting techniques.

14c-48. An Efficient Layout for Bronze Melting. Bruce Schafer. *Foundry,* v. 76, Aug. 1948, p. 212-213, 216, 218.

Two examples.

14d—Light Metals

14d-41. Grain Size Control in Magnesium Casting Alloys. *Industrial Heating,* v. 15, July 1948, p. 1140, 1158. Based on paper by Vernon C. F. Holm and Alexander I. Krynitsky.

Previously abstracted from *Foundry,* v. 75, Oct. 1947, p. 81, 228, 230, 232, 234, 236, 238, 240. See item 14-296, 1947.

14d-42. Modern Practices in Sand Casting of Magnesium Alloys. T. R. B. Watson. *Canadian Metals & Metallurgical Industries,* v. 11, July 1948, p. 16-19, 41.

Also deals briefly with production of magnesium, properties, corrosion resistance, alloys, heat treatment, and chrome pickling.

14d-43. Aluminium Alloy Casting Developments. E. G. West. *Foundry Trade Journal,* v. 84, June 24, 1948, p. 607-612; v. 85, July 1, 1948, p. 7-12.

Stages in the development of the aluminum-base casting alloys in use today. Various improvements which have taken place in the processes and techniques involved in their manufacture. Applications and new outlets being explored. 12 ref.

14d-44. Un tour d 'horizon sur les fonderies Francaises d 'alliages légers. Premiere Partie. L'equipement des fonderies. (A Survey of French Light-Alloy Foundries. Part One. Foundry Equipment.) Charles Roinet. *Revue de L'Aluminium,* v. 25, June 1948, p. 187-195.

Also describes melting techniques. (To be continued.)

14d-45. Recommended Practices for Sand Casting Aluminum and Magnesium Alloys. *American Foundrymen's Association,* 1948, 55 pages.

Recommended practices covering a wide range of aluminum-base alloys both of the heat treated and the nonheat treated types; general recommendations for founding aluminum-base alloys pertaining to molding practice, including sands used, facings, gating and risering, core practice, melting and pouring, finishing, heat treatment, and causes and remedies for defects. Chemical control limits, physical properties, conforming specifications, developments, and fields of use for each group of alloys. Each alloy is identified by an A.S.T.M. number which is immediately followed by parentheses enclosing the common or trade number of the alloy which is most familiar to foundrymen.

For additional annotations indexed in other sections, see:
3b-113.

(Turn to page 38)

EXHIBITORS

Hamilton Manufacturing Co., Two Rivers, Wis. Booth 1576. Drafting-room equipment.

Handy & Harman, New York 7. Booth 132. Brazing equipment.

Hanson-Van Winkle-Munning Co., Matawan, N. J. Booth 607. Plating and finishing equipment and supplies.

Harnischfeger Corp., Milwaukee 14. Booth 1728. Arc welders; positioners; handling equipment.

Harper Electric Furnace Corp., Niagara Falls, N. Y. Booth 605. High-temperature electric furnaces.

Harvey Machine Co. Inc., Torrance, Calif. Booth 1449. Aluminum extrusions; special shapes.

Hauck Manufacturing Co., Brooklyn 15, N. Y. Booth 1326. Oil burners; valves.

Hayes, Inc., C. I., Providence 5, R. I. Booth 1557. Electric furnaces for heat treating and brazing.

Haynes Stellite Co., Kokomo, Ind. Booth 1602. High-temperature and corrosion resistant alloys; precision castings; hard facing rods and tools.

Heli-Coil Corp., Long Island City, N. Y. Booth 1330. Heli-Coil inserts; screw thread systems.

Hobart Brothers Co., Troy, Ohio. Booth 944. Electric arc welding equipment.

Hones, Inc., Charles A., Baldwin, Long Island, N. Y. Booth 1304. Gas-fired oven furnaces; burners.

Houghton & Co., E. F., Philadelphia 33. Booth 832. Cutting oils; heat treating compounds; metal cleaners.

Hunter Spring Co., Lansdale, Pa. Booth 1666. Springs.

I

Illinois Testing Laboratories, Inc., Chicago 10. Booth 1431. Temperature, air and dew point measuring instruments.

Industrial Heating. Booth 1533. (See National Industrial Publishing Co.)

Industrial Press, New York 13. Booth 1860. Trade papers and engineering data.

Industrial Publishing Co., Cleveland 13. Booth 440. Magazines and publications.

Industry and Welding. Booth 440. (See Industrial Publishing Co.)

International Nickel Co., New York 5. Booth 226. Nickel and nickel alloys; nickel steel and cast iron; stainless steels.

International Tin Research Institute. Booth 1325. Tin and its alloys and applications.

Invincible Vacuum Cleaner Mfg. Co., Dover, Ohio. Booth 1566. Welding flux recovery equipment.

Iron Age, New York 17. Booth 410. Publications; reprints; technical manuals.

J

Jackson Buff Corp., Long Island City 1, N. Y. Booth 1710. Ventilated buffs.

Jackson Products, Warren, Mich. Booth 1933. Electrode holders and arc welding accessories.

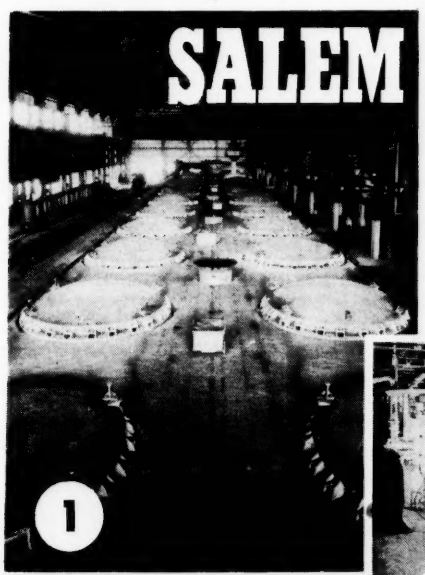
Janney Cylinder Co., Philadelphia 36. Booth 1450. Finish-machined products made from centrifugal castings of ferrous and nonferrous alloys.

Jarrell-Ash Co., Boston. Booth 1761. Precision scientific apparatus.

Jelliff Mfg. Corp., C. O., Southport, Conn. Booth 1850. Wire cloth and mesh; industrial ceramic muffle furnace; laboratory furnaces; heating elements.

Joseph, E. R., Norristown, Pa. Welding distributors.

(Turn to page 41)



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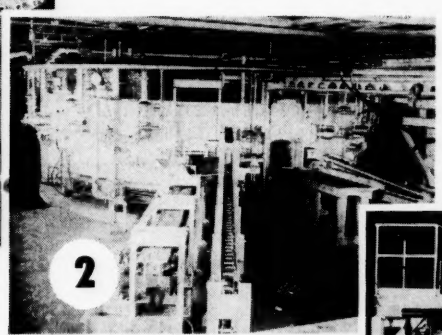
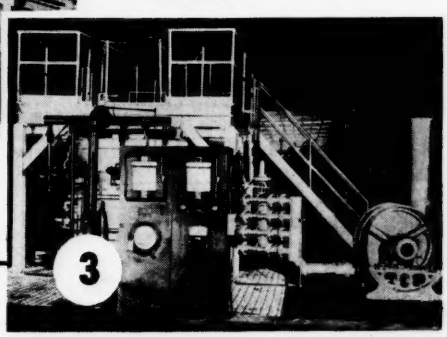


1. A recent circular pit installation.
2. Typical Rotary Hearth installation with automatic charge and discharge.
3. Small pit-type heat-treating furnace.



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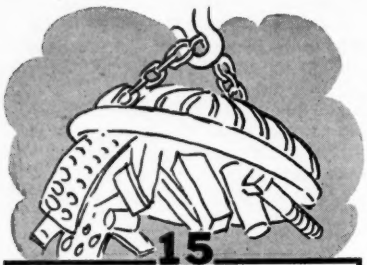

15 SCRAP and BYPRODUCT UTILIZATION

15a-General

15a-11. Making Chip Salvage Pay an Extra Profit. *Factory Management and Maintenance,* v. 106, Aug. 1948, p. 74-75.

15a-12. Utilizing Nonferrous Scrap Conserves Metal Resources. Earl S. Schwartz. *American Foundryman,* v. 14, Aug. 1948, p. 38-40.

Problems encountered by the smelter and refiner of nonferrous scrap in melting and refining the various grades of secondary metals and producing alloys to strict chemical specifications.

15d—Light Metals

15d-7. Remelting Light Alloys; Metallurgical and Engineering Considerations. Yves Dardel. *Metal Industry,* v. 73, July 2, 1948, p. 3-5; July 9, 1948, p. 27-30.

The mount of insoluble impurities introduced by additions of scrap when remelting light alloys is a factor of considerable importance. Sources, effect on properties, and maximum amounts permissible. Elimination of hydrogen, inverse segregation, furnace design, low-frequency induction furnaces, gas furnaces, cleaning the scrap, and degassing.

15d-8. Super-Purity Aluminium; Scrap Refining by Three-Layer Electrolysis. *Metal Industry,* v. 73, July 16, 1948, p. 51-52. Based on a recent B.I.O.S. report.

Three-layer refining furnace consists of a bath containing a layer of an Al-Cu alloy, a molten fluoride electrolyte, and a layer of molten pure Al. (To be continued.)

15d-9. A Good Recovery. *Light Metals,* v. 11, July, 1948, p. 364-373.

Obsolete aircraft released at the cessation of hostilities provided an important reserve of aluminum. The recovery of this material.

15d-10. Magnesium Alloy Scrap. A. G. Arend. *Metallurgia,* v. 38, July 1948, p. 173.

Helium is obtained in this country only as a by-product from atmospheric gas separation to the extent of 1 part in 200,000 parts of air. Availability with regard to use in reclaiming magnesium.

For additional annotations indexed in other sections, see:
22b-243.

A practical presentation of heat treatment theory
PRINCIPLES OF HEAT TREATMENT
by M. A. Grossmann
244 pages—$3.50
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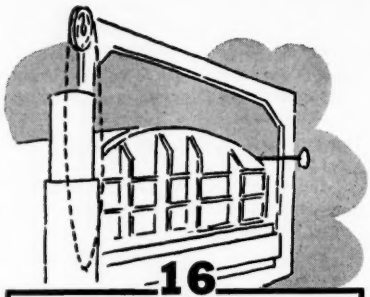

16 FURNACES and HEATING DEVICES

16a—General

16a-67. Infra-Red Drying. *Sheet Metal Worker,* v. 39, July 1948, p. 48-50.

Approved practices and booth design for painted metal surfaces.

16a-68. Heating Metals by Induction and High-Speed Gas Methods. H. R. Clauser. *Materials & Methods,* v. 28, July 1948, p. 55-59.

Relative advantages and disadvantages of both methods and also compares them with conventional furnace methods. (Partially based on a report prepared for the A.G.A. by Battelle Memorial Institute.)

16a-69. Electrically-Conductive Rubber. *Materials & Methods,* v. 28, July 1948, p. 60-61.

Properties and applications of new product. Among the latter are panels for space heating and for miscellaneous industrial heating applications.

16a-70. Trends in Induction Heating. H. B. Osborn. *Steel Processing,* v. 34, July 1948, p. 360-361.

A condensation.

16a-71. Principal Limitations of Dielectric Heating. Carl J. Madsen. *Industrial Heating,* v. 15, July 1948, p. 1146, 1148, 1150.

Major limitations that prevent universal application.

16a-72. Proper Frequency for Induction Heating of Nonmagnetic Metals. J. T. Vaughan and H. B. Osborn, Jr. *Metal Progress,* v. 54, July 1948, p. 46-50.

Heating of nonmagnetic materials such as copper, aluminum, or austenitic steels. However steel, a magnetic material, loses its magnetic properties in the temperature range used for hardening or forging, so the information is also applicable to induction heating of steel.

16a-73. Furnaces for By-Product Fuels. Otto de Lorenzi. *Transactions of the American Society of Mechanical Engineers,* v. 70, May 1948, p. 351-358; discussion, p. 358-362.

A number of furnace designs developed to handle byproduct fuels from oil-refinery operations, and the manufacture of steel, coke, lumber, pulp, and sugar.

16a-74. How to Design Work Coils for Induction Heating. Ben H. Griffith, Jr., and Ray Skiba. *American Machinist,* v. 92, Aug. 12, 1948, p. 99-110.

Practical mechanics of coil construction, and methods of arriving at final coil design, theoretical calculations leading to design, applications.

16a-75. Electric Furnaces for the Wire Industry. Part 2. H. J. Tucker and J. A. Monks. *Wire Industry,* v. 15, July 1948, p. 451-454.

Protective atmosphere generators and continuous wire-patenting furnaces. (To be continued.)

16a-76. Basic Structural Design and Operating Conditions of Electric Ore-Melting Furnaces. (In Russian.) S. S. Mikulinsky. *Promyshlennaia Energetika* (Industrial Power), no. 4, April 1948, p. 1-3.

Criteria of structural design and operating conditions of electric ore-melting furnaces and the determination of optimum conditions. Experimental results demonstrate the validity of computations.

16a-77. Automatic Regulation for Electric Ore Melting Furnaces. (In Russian.) Yu E. Efroimovich. *Promyshlennaia Energetika* (Industrial Power), no. 5, 1948, p. 7-9.

Circuit diagrams of the automatic regulator for electric ore-melting furnaces. The theoretical bases and the computations of the relay coefficients.

16a-78. Heating Factory Furnaces With Flameless Gas. (In Russian.) V. S. Gavripenko. *Promyshlennaia Energetika* (Industrial Power), no. 5, 1948, p. 9-11.

Technical characteristics of certain forging furnaces using flameless combustion.

16a-79. Trends in Salt Bath Heat Treatment. H. J. Babcock. *Steel Processing,* v. 34, Aug. 1948, p. 435-438.

Condensed from an address dealing with mechanized operations and production units.

16b—Ferrous

16b-67. The Maintenance of Blast-Furnace and Ancillary Plant. Arthur Bridge. *Journal of the Iron and Steel Institute,* v. 159, June 1948, p. 193-204.

16b-68. The Application of Fuel Oil and Surplus Gas at an Integrated Iron and Steel Works. *Journal of the Institute of Fuel,* v. 21, June 1948, p. 254-258.

Appendix and discussion of a paper by J. Sinclair Kerr. (April issue).

16b-69. Hardening With Atmospheres From Standard Raw Gas. J. G. Hoop. *Steel Processing,* v. 34, July 1948, p. 362-365.

Controlled-atmosphere generators, heat treating furnaces, and "carbon-potential indicator" used to assist in adjustment of the generators and to determine protective-atmosphere quality.

16b-70. Steel Making, Heating and Heat Treating Furnaces at the Kaiser Fontana Plant: II. *Industrial Heating,* v. 15, July 1948, p. 1114-1118, 1120, 1158.

The structural mill reheating furnaces, the furnaces serving the merchant mill, flash baking and annealing wire-mill equipment, alloy-steel finishing facilities, and the slow-cooling pit for alloy steels.

16b-71. Electric Arc Melting Furnace Practice Here and Abroad. *Industrial Heating,* v. 15, July 1948, p. 1152, 1154, 1156, 1158. Based on talk by W. B. Wallis.

Previously abstracted from *Journal of the Electrochemical Society,* v. 93, March 1948, p. 46 N-50 N.

16b-72. Elimination of Sulphur in the Blast-Furnace. D. Joyce. *Journal of the Iron and Steel Institute,* v. 159, July 1948, p. 291-296.

Production of iron with low sulphur content and how to utilize this content as a guide to furnace conditions.

16b-73. Rotary Hearth Furnaces Find Many Uses in Heating Steel. R. E. Buckholdt. *Blast Furnace and Steel Plant,* v. 36, Aug. 1948, p. 937-941.

Furnace and its adaptability.

16b-74. Oxygen in the Electric Furnace. J. H. Berryman and J. M. Crockett. *Iron Age,* v. 162, Aug. 5, 1948, p. 72-75, 144.

(*Turn to page* 40)

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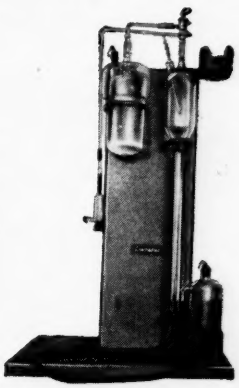

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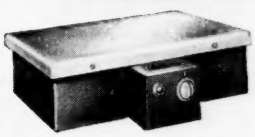

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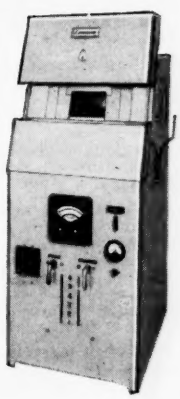

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16b-75. Water-Cooled Cupola Features Duplexing Plant. E. S. Kopecki. *Iron Age*, v. 162, Aug. 19, 1948, p. 81-85.

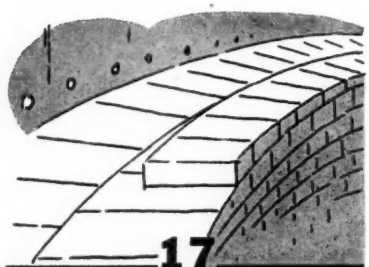
Description of cupola, and performance data obtained to date. Features unusual tuyere design, increased blast pressure, and resemblance to a miniature blast furnace.

16c—Nonferrous

16c-5. Good Housekeeping in a Gun Factory. Arthur Q. Smith. *Industrial Gas*, v. 27, July 1948, p. 8-9.

Gas-fired crucible furnaces, coredrying ovens, and other equipment in the nonferrous foundry.

For additional annotations indexed in other sections, see:
3b-108; 17-73.



17 REFRACTORIES and FURNACE MATERIALS

17-70. Permeability Data on American Refractories. D. O. McCreight. *American Ceramic Society Bulletin*, v. 27, July 15, 1948, p. 257-262.

Previously abstracted from condensed version in *Industrial Heating* v. 14, Oct. 1947, p. 1734, 1736, 1738, 1740. See also 17-89, 1947.

17-71. Some Considerations in the Use of Carbon Refractories in Blast Furnaces. W. S. Debenham. *Ceramic Age*, v. 52, July 1948, p. 24-26. A condensation.

Previously abstracted from *Steel*, v. 123, July 12, 1948, p. 110, 113, 124, 127-128, 130. Item 17-67, 1948.

17-72. Recent Trends in the Ceramic Industry. *Chemical Engineering*, v. 55, July 1948, p. 127-134.

Trends in porcelain enamel, electrical porcelain, china tableware, glass, chemical ware, structural clay products, refractories, and sanitary ware.

17-73. Effect of Gas Atmospheres on Furnace Heat Losses. G. C. Nonken. *Steel Processing*, v. 34, July 1948, p. 377-381.

Since published data on thermal conductivity of insulating materials and refractories was collected with the pores filled with air, measurements were made using several other atmospheres often encountered in practice. Comparisons were made between measured and calculated thermal-conductivity values and the effects of gas atmospheres on total heat loss from typical furnaces were determined. Thermal conductivity, when filled with hydrogen, may be as much as three times the value when filled with air. It was also found that heat losses are greatly increased.

17-74. Investigation of Abrasion Resistance of Various Refractories. Kenneth A. Baab and Hobart M. Kraner. *Industrial Heating*, v. 15, July 1948, p. 1206, 1208. A condensation.

Test method and results obtained on 23 brands of brick for abrasion resistance, as well as modulus of rupture, apparent porosity, and bulk specific gravity. Sixteen brands of fireclay brick were also given a rattler test.

17-75. Carbon as a Refractory Material. *Industrial Heating*, v. 15, July 1948, p. 1214, 1216. Condensed from paper by F. B. Thatcher.

The history of the use of carbon in blast-furnace hearths and its advantages.

17-76. High Temperature Ceramic and Cermet Materials. A. L. Berger, *Enamelist*, v. 25, July 1948, p. 38-39, 42-48.

Recent developments, especially for use in various types of prime movers; also research sponsored by the U. S. Army's Air Materiel Command at the various institutes and colleges. Melting point and stability of high-melting metal-base compounds; and physical and chemical properties of 10 ceramic refractories.

17-77. Mechanism of Nozzle Erosion in Open Hearth Ladles. R. B. Snow and James A. Shea. *Steel*, v. 123, July 26, 1948, p. 88, 91, 94.

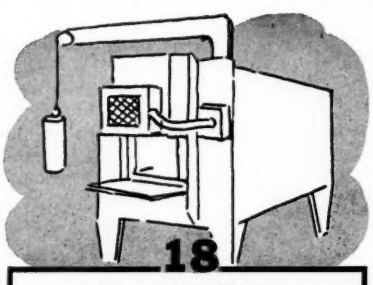
Results of experiments made to determine the above and also the relationships, of grade of steel, temperature, composition and physical characteristies of the nozzle material, and temperature of firing of the nozzle material to amount of enlargement of the bore.

17-78. Carbon Brick Tank Linings Used for Pickling Stainless Steels. *Steel*, v. 123, Aug. 2, 1948, p. 101, 104, 106.

Material has proved to be unaffected by HNO_3 and HF at concentrations and temperatures needed for proper pickling. Maintenance problems are outlined.

17-79. Qualites des differents pises francais actuels compares a certains produits etrangers. (Properties of Different French Furnace-Lining Materials as Compared With Certain Foreign Products.) Pierre Nicolas. *Fonderie*, v. 28, April 1948, p. 1124-1132.

Physical and chemical analysis, heat resistance, and resistance to corrosion under operating conditions of various refractory materials from Germany, Belgium, and France. Results indicate that the French materials are just as good as the foreign ones.



18 HEAT TREATMENT

18a—General

18a-19. W. S. Bidle Co. Equipped for Commercial Heat Treating. *Industrial Heating*, v. 15, July 1948, p. 1220-1222, 1224, 1226, 1228.

Facilities of Cleveland firm.

18a-20. Heat Treating Today. Arthur R. Elsea. *Metals Review*, v. 21, July 1948, p. 9, 11.

Reviews literature of the past year, which is said to have been largely a period of assimilation and discussion of wartime research rather than one of new developments. (References to "A.S.M. Review of Current Metal Literature".)

18a-21. Heat Treating Equipment and Supplies. *Metals Review*, v. 21, July 1948, p. 13, 15, 17, 19, 21, 23.

New products introduced during the past six months in above category.

18a-22. The Thermal Etching of Metals. R. Shuttleworth. *Metallurgia*, v. 38, July 1948, p. 125-131.

When a polished metal specimen is maintained at a high temperature, grooves develop where the crystal boundaries intersect the surface, and in some atmospheres striations form on the crystals. Observations of these phenomena for iron and steel, copper, tungsten and tantalum, and silver. The various theories advanced to explain the formation of boundary grooves and striations.

18b—Ferrous

18b-107. Fundamentals Behind Heat Treating Operations. Chester M. Inman. *Metals Review*, v. 21, July 1948, p. 3, 5, 7.

First of a series of three lectures for the practical man on everyday problems in the working of steel.

18b-108. Principles and Applications of Isothermal Heat Treatment. J. M. Hodge. *Steel Processing*, v. 34, July 1948, p. 375-376. A condensation.

Deals only with steel.

18b-109. The Practical Use of a Controlled Atmosphere. A. W. Frank. *Industrial Heating*, v. 15, July 1948, p. 1124-1126, 1128, 1130.

Controlled-atmosphere generators made by Hevi Duty Electric Co., and some of the practical problems involved in using a controlled atmosphere for hardening steels.

18b-110. Multiple Tempering of Low-Alloy Toolsteel. B. Z. Berman. *Metal Progress*, v. 54, July 1948, p. 64.

Outlines technique developed to produce a screwdriver bit (minimum cross section 0.032 x 0.250 in.) able to withstand a twisting torque of 40 in.-lb. from 0.50%-C, 0.40%-Mn, 1.00%-Si, 0.50-Mo toolsteel.

18b-111. The Heat Treatment of Iron and Steel, Recalescence. L. F. Keeley. *Machinery Lloyd*, (Overseas Edition), v. 20, July 3, 1948, p. 68-72.

The fundamental mechanisms of heat treatment and the phase transformations accompanying it, including the phenomenon of increase in brightness at certain intermediate temperatures during gradual cooling from the incandescent state.

18b-112. Atmospheres for the Heat Treatment of Steel. Floyd E. Harris. *Metal Progress*, v. 54, Aug. 1948, p. 175-179.

A generalized but simplified statement of the commercial atmospheres used for modern heat treatment of steel, the elementary chemistry and physics applying to gas-metal reactions and diffusion of carbon, and a little of the historical background showing how present practice has been achieved after traveling down a long road of development. (To be continued.)

18b-113. Annealing Malleable Iron Castings. E. G. Billhardt. *Iron Age*, v. 162, Aug. 19, 1948, p. 86-89.

Featuring accurate and automatic

(Turn to page 42)

EXHIBITORS

K

Kalamazoo Tank & Silo Co., Machine Tool Div., Kalamazoo 16, Mich. Booth 1462. Horizontal-type metal cutting band saw.

Kanthal Co., AB. (See C. O. Jelliff Mfg. Corp.)

KE Industries, Minneapolis. Booth 1929. Diamond wheels and diamond tools.

Keen Compressed Gas, Wilmington, Del. Booth A-1567. Welding distributor.

Kemp Mfg. Co., C. M., Baltimore 2, Md. Booth 1318. Burners; heating units; control equipment.

Kent Co. Inc., Rome, N. Y. Booth 1957. Floor machines and suction cleaners.

King, Andrew, Narberth, Pa. Booth 411. Portable Brinell hardness tester; folding Brinell microscope.

Kropp Forge Co., Chicago 50. Booth 848. Flat die, drop forge and upset forgings.

Krouse Testing Machine Co., Columbus 3, Ohio. Booth 133. Rotating beam machines; universal spring fatigue machine; creep rack.

Kux Machine Co., Chicago 24. Booth 908. Die casting machines; powder metal press.

L

Larkin Lectro Products Corp., New York 30. Booth 1757. Arc and spot welders.

Leeds & Northrup Co., Philadelphia 44, Booth 1910. Temperature recorders and controllers; heat treating furnaces.

Lepel High Frequency Laboratories, Inc., New York 23. Booth 1749. High-frequency induction heating equipment.

Libert Machine Co., Green Bay, Wis. Booth 718. (See Edward A. Lynch Machinery Co.)

Lincoln Electric Co., Cleveland 1. Booth 1645. Arc welding equipment and supplies, hidden-arc welding.

Lindberg Engineering Co., Chicago 12. Booth 344. Heat treating furnaces and equipment.

Linde Air Products Co., New York. Booth 1602. Gas welding and cutting equipment and supplies; Unionmelt; Heliarc.

Lipe-Rollway Corp., Syracuse, N. Y. Booth A-1564. Power hacksaw machine.

Liquid Carbonic Corp., Wall Chemicals Div., Chicago 23. Booth 1931. Gas welding and cutting equipment.

Lithium Co., Newark 4, N. J. Booth 1409. Lithium atmosphere heat treating and forging furnaces.

Lobdell Co., Wilmington, Del. Booth 1856. Forging hammers.

Los Angeles, City of, Department of Water and Power, Los Angeles. Booth 1344. Utilities.

Los Angeles Chamber of Commerce, Los Angeles. Booth 1344. Pictorial display.

Lukens Steel Co., Coatesville, Pa. Booth 320. Steel plate; clad steels.

Lukenweld Division, Lukens Steel Co., Coatesville, Pa. Booth 320. Nickel-clad, monel-clad and inconel-clad steels.

Lynch Machinery Co., Edward A., Ardmore, Pa. Booth 718. Metalworking machinery.

M

Machine Design. Booth 1744. (See Penton Publishing Co.)

Machinery. Booth 1860. (See Industrial Press.)

Machinery & Welder Corp., St. Louis 10. Booth 1553. Resistance welding machines.

Magnaflux Corp., Chicago 31. Booth 723. Magnetic flaw detection equipment; thickness gage.

Magnetic Analysis Corp., Long Island City 1. Booth 1826. Magnetic inspection equipment; comparators.

Mallory & Co., Inc., P. R., Indianapolis 6. Booth 637. Resistance welding electrodes, holders, dies; electrical contacts.

Manganese Steel Forge Co., (See Audubon Wire Cloth Corp.)

Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J. Booth 1550. Abrasive disks; grinding and cutting wheels.

Materials & Methods, New York 18. Booth 107. Publications.

McCracken & Sons, Inc., R. S., Philadelphia 23. Booth A-1567. Welding supplies.

McGraw-Hill Publishing Co., Inc., New York 18. Booth 1844. Magazines and books.

McKay Co., York, Pa. Booth 1833. Welding electrodes.

Meehanite Metal Corp., New Rochelle, N. Y. Booth 1610. As-cast and machined Meehanite castings.

Merrill Brothers, Inc., Maspeth, N. Y. Booth A-1553. Drop forgings, shackles, eyebolts.

Metal & Thermit Corp., New York 5. Booth 426. Arc welding electrodes.

Metal Finishing. Booth 603. (See Finishing Publications, Inc.)

Metal Finishing Service, Chicago 1. Booth 1924. Microblast honing equipment and supplies.

Metal Progress. Booth 241. (See American Society for Metals.)

(*Turn to page* 43)

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time-temperature control, economy in operation, and flexibility in simultaneously annealing wide ranges of sizes and shapes of parts, the annealing furnace installation at Lake City Malleable typifies the advantages of electrically-heated elevator furnaces for annealing malleable iron castings. Furnace construction and cost and production data.

18b-114. Uber die autogene Oberflächenhärtung von Stahl. (Autogenous Surface Hardening of Steel.) H. Kalpers. *Metalloberfläche,* v. 1, July 1947, p. 157-160.

Process of autogenous surface hardening and its economy and application to numerous articles of steel. Burners and apparatus used for this purpose.

18b-115. The Influence of Temperature and Time of Heating on the Reduction of Residual Stress in Austenitic Steels. (In Russian.) L. A. Glickman and V. P. Tyekht. *Kotloturbostroenie* (Boiler and Turbine Manufacture), March-April 1948, p. 12-16.

The residual stress in disks of austenitic chromium-nickel steel (type YeYa 2 T) have been induced artificially using a heat treatment. Influence of the temperature of drawing in the temperature ranges of 600 to 850° C. on the decrease of residual stresses. Method of investigation and computation of obtained data using formula of Sachs. 14 references.

18b-116. Control of Carbon Content During Heat Treatment of Steel in Atmosphere Furnaces. W. H. Holcroft and Edward C. Bayer. *Materials & Methods,* v. 28, Aug. 1948, p. 59-61.

Basic facts of gaseous equilibrium and the use of equilibrium curves in the control of carbon concentration.

18b-117. A Progress Report on Experimental Development of Surface Carbon Restoration in Decarburized Coiled Rod and Wire Material. J. L. Kozma. *Wire and Wire Products,* v. 23, Aug. 1948, p. 680-689, 719-720.

Carbon restoration process, equipment and mechanism of carbon restoration. Chart of condensed data regarding carbon restoration tests on surface decarburized 1035 and 1038 steel rod; results of microscopic examination; and other data based on test charges.

18b-118. Impregnating Steel With Aluminum. *Steel,* v. 123, Aug. 23, 1948, p. 110.

Method used to improve corrosion resistance and conductivity.

18c—Nonferrous

18c-5. Properties of Aluminum Bronzes at Subzero and High Temperatures. Robert I. Jaffee and Robert H. Ramsey. *Metal Progress,* v. 54, July 1948, p. 57-63.

Results of a comprehensive series of tests on three typical aluminum bronzes, over a wide range of temperature. Welding of wrought specimens decreases the impact and elongation values at subzero temperatures.

18d—Light Metals

18d-9. Aluminum Alloy Castings. Floyd A. Lewis. *Foundry,* v. 76, Aug. 1948, p. 96-99, 226, 228, 230, 232.

Various forms of heat treatment for improving physical properties. (Based on a survey conducted by the Foundry Division of the Aluminum Association.)

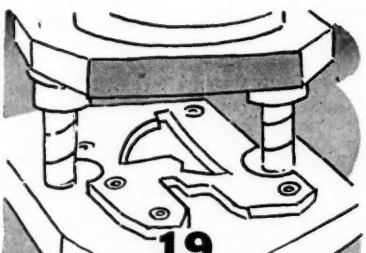
18d-10. Uber die Warmaushärtung von Aluminium-Zink-Magnesium-Knetlegierungen. (High-Temperature Age Hardening of Aluminum-Zinc-Magnesium Malleable Alloys.) Walter Bungardt and Victor Hauk. *Metallforschung,* v. 2, June 1947, p. 161-168.

Effect of the quenching temperature on the age hardening of fine Al-Zn-Mg alloys at room and elevated temperatures. It was found that the rate of heating affected the age hardening process of the alloys, depending on their Mn and Si contents.

18d-11. Einfluss einer thermischen Vorbehandlung auf die Korngrösse von ausgehärteten Blechen einer Legierung der Gattung Al-Cu-Mg nach kritischer Verformung. (Effect of a Preliminary Heat Treatment, After Critical Working, on the Grain Sizes of Hardened Sheets of an Al-Cu-Mg Alloy.) Guido Bassi. *Metallforschung,* v. 2, June 1947, p. 191-192.

Treatment will prevent grain growth.

For additional annotations indexed in other sections, see:
3b-118-120-123; 3c-18; 4b-51; 17-73.



19 WORKING

19a—General

19a-161. Designing of "Trouble-Free" Dies. Part LXXXIII. Types of Presses, Their Uses and Capacities. C. W. Hinman. *Modern Industrial Press,* v. 10, July 1948, p. 20,32.

19a-162. Work Center System Improves Production Efficiency at Richmond Engineering Company. Gerald E. Stedman *Modern Industrial Press,* v. 10, July 1948, p. 40, 42, 44.

Fabricates steel plate, aluminum, copper alloys, Monel, and stainless steel, working plate up to 1 in. thickness. Both cold and hot-formed heads for a great variety of pressure vessels and tanks are produced in sizes up to 30,000 gal. capacity or over and in diameters up to 12 ft. Equipment, procedures, and layout.

19a-163. Rectifier Production at McColpin-Christie Corp., Ltd. William Edwards. *Modern Industrial Press,* v. 10, July 1948, p. 51-52.

Press operations.

19a-164. Centerless Plunge-Grinding. *Aircraft Production,* v. 10, July 1948, p. 231.

Automatic loading and operation control.

19a-165. Tube-Bending. *Aircraft Production,* v. 10, July 1948, p. 232-234.

High-production, hydraulically-controlled machine.

19a-166. Form Dressing. *Aircraft Production,* v. 10, July 1948, p. 235-237.

Operation of improved diaform attachment for use on horizontal-spindle surface grinders and incorporating a pantograph for guiding a diamond-tipped dressing tool from a templet to produce desired contours.

19a-167. Stamping Data. I. *American Machinist,* v. 92, July 29, 1948, p. 125.

Formula and bend allowance chart (metal thickness vs. degrees of bend.)

19a-168. A Theory of the Yielding and Plastic Flow of Anisotropic Metals. R. Hill. *Proceedings of the Royal Society,* ser. A, v. 193, May 27, 1948, p. 281-297.

A theory for plastic flow. The type of anisotropy considered is that resulting from preferred orientation. A yield criterion is postulated on general grounds which is similar in form to the Huber-Mises criterion for isotropic metals, but which contains six parameters specifying the state of anisotropy. The theory was applied to experiments of Korber & Hoff (1928) on the necking under uniaxial tension of thin strips cut from rolled sheet. It was shown that there are generally two, equally possible, necking directions whose orientation depends on the angle between the strip axis and the rolling direction. Pure torsion of a thin-walled cylinder was also analyzed. With increasing twist, anisotropy is developed. The theory was also applied to determine the earing positions in cups deep-drawn from rolled sheet. 12 ref.

19a-169. Heavy Forging Plants. *Iron and Steel,* v. 21, July 1948, p. 349-350.

Equipment and some procedures utilized at various German plants.

19a-170. Large Hydraulic Forging Presses. M. D. Stone. *Transactions of the American Society of Mechanical Engineers,* v. 70, July 1948, p. 499-514.

Development of the above, culminating in the 14,000-ton forging presses built for the U. S. Navy during the recent war. A detailed account of the design, construction, installation, and operation of two of the latter presses is given as well as comparative performance data and cost studies. Numerous German installations of heavy stamping or die-forging presses with capacities up to 30,000 metric tons. Press-design calculations.

19a-171. Unconventional Tooling. J. S. Needham. *Aircraft Production,* v. 10, Aug. 1948, p. 253-255.

Design and use of certain de Havilland Dove rubber-die press tools which are out of the ordinary for work in this category. Tooling cost, weight and material economy, appearance and production cost of components have all been studied in the production of these tools.

19a-172. Lamination Die Design. Martin George. *Tool & Die Journal,* v. 14, Aug. 1948, p. 40-43, 62, 64, 78-79.

Principles of design of dies for production of laminated sheet metal pieces used by the electrical industry.

19a-173. Short Run Dies of Wood, Glass and Concrete. Walter Rudolph. *Automotive Industries,* v. 99, Aug. 1, 1948, p. 46-47, 88.

Applications and possible savings effected.

19a-174. Wire Mill Practice. Part 3. Consideration of Drawing Die Efficiency. W. F. G. Kerley. *Wire Industry,* v. 15, July 1948, p. 457-458.

Factors relevant to diamond die efficiency. Tests on drawing-die shape. (To be continued.)

19a-175. Why Hydraulic Presses? Part II. Herbert Chase. *Tool & Die Journal,* v. 14, Aug. 1948, p. 44-47.

Advantages over crank presses, giving various examples of their successful application. (To be continued.)

(Turn to page 44)

EXHIBITORS

Metallizing Co. of America, Chicago 24. Booth 741. Metal spraying and salvaging equipment.

Metals Disintegrating Co., Inc., Elizabeth (B), N. J. Booth 937. Powder metal products.

Metals Review, Cleveland 3. Booth 241. (See American Society for Metals.)

Metlab Co., Philadelphia 18. Booth 113. Heat treating methods and operations.

Michiana Products Corp., Michigan City, Ind. Booth 1650. Stainless, heat resistant and abrasion resistant castings.

Michigan Steel Casting Co., Detroit 7. Booth 914. Stainless and heat resisting castings; precision castings; rolled products.

Micro Metallic Corp., Brooklyn 7, N. Y. Booth 1664.

Midvale Co., Philadelphia 40. Booth 238. Special steel products.

Milne & Co., A., New York 14. Booth 1366. Steel distributors.

Milton Equipment Co., Philadelphia 6. Booth 1715. Sheet metalworking equipment.

Minneapolis-Honeywell Regulator Co., Minneapolis. Booth 203. (See Brown Instrument Co.)

Morton Gregory Corp. (See Nelson Stud Welding Division.)

Motch & Merryweather Machinery Co., Cleveland 13. Booth 642 and 648. Sawing machines; saw sharpening machines; saw blades.

N

National Bronze & Aluminum Foundry Co., Cleveland 14. Booth 902. Precision castings; Al-Fin, aluminum bonded to ferrous metals.

National Carbon Co., Inc., Cleveland. Booth 1602. Graphite electrodes; carbon refractories and molds; heat exchangers.

National Diamond Hone & Wheel Co., New York 7. Booth 1848. Industrial diamond tools; powder metal bearings.

National Industrial Publishing Co., Pittsburgh 19. Booth 1533. Publications.

National Lead Co., New York 6. Booth 1915. Lead primary products and end products.

National Radiator Co., Johnstown, Penna. Booth 606. (See Plastic Metals Div.)

National Research Corp., Boston 15. Booth 601. Vacuum-cast metals; high-vacuum furnaces and equipment.

Naval Gun Factory. Booth 1952 (See Navy Department, Bureau of Ships.)

Navy Department, Bureau of Ships, Annapolis, Md. Booth 1952. Naval metallurgical development and activities.

Nelson Stud Welding Div., Morton Gregory Corp., Lorain, Ohio. Booth 856. Stud welders.

New Equipment Digest. Booth 1744. (See Penton Publishing Co.)

New Jersey Zinc Co., New York 7. Booth 326. Zinc die castings and finished products.

Niagara Blower Co., New York 17. Booth A-1544. Cooling and air conditioning equipment.

North American Philips Co., Inc., Mt. Vernon, N. Y. Booth 147. Diffraction equipment and cameras; X-ray spectrometers.

Northwestern Tool & Engineering Co., Dayton 3, Ohio. Booth 1360. T-nut and stud sets; step blocks; standard jig and fixture components.

O

Occupational Hazards. Booth 440. (See Industrial Publishing Co.)

Ohio Crankshaft Co., Cleveland 1. Booth 304. High-frequency induction heating equipment.

Ohio Seamless Tube Co., Shelby, Ohio. Booth 623. Seamless and electric welded steel tubing.

(*Turn to page* 45)

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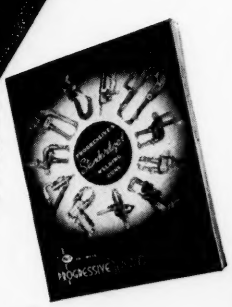

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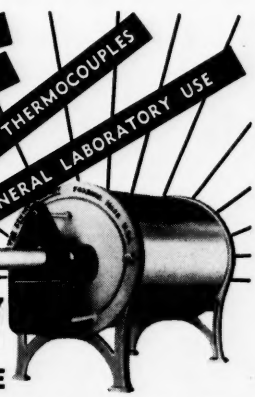

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Builders of Sentry High Speed Steel Hardening Furnaces and Sentry Diamond Blocks.

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19a-176. Production Standards Raised by Improved Processes. *Production Engineering & Management,* v. 22, Aug. 1948, p. 56-62.

Special-purpose machines that have materially reduced the processing time on many of the heater components. Reduction of stockpiling of sheet, simplification of material feeding, and continuous welding process.

19a-177. Productive Machine Time Increased With Carbide Lamination Dies. Frank M. Scotten. *Production Engineering & Management,* v. 22, Aug. 1948, p. 47-49.

Operating economies, resulting from the use of carbide lamination dies presage an expanding use of carbide for blanking and piercing operations on light-weight sheet steel.

19a-178. Impact Extrusions; Their Design and Production. Herbert Chase. *Machinery,* v. 54, Aug. 1948, p. 147-152.

Advantages, limitations, production methods, and application of impact extrusions. (To be continued.)

19a-179. Fundamentals of Forging Practice. (Continued.) Waldemar Naujoks. *Steel,* v. 123, Aug. 2, 1948, p. 91-94, 96, 98.

Various types of forging equipment, including helve power and general forging hammers, hydraulic presses, board and steam drop hammers, forging machines, and rolls. (To be continued.)

19a-180. Die-Casting Dies. W. M. Halliday. *Metal Industry,* v. 73, July 23, 1948, p. 63-65, 70.

Toolroom fixtures, devices and methods for proving the production ability of new dies.

19a-181. Get More From Your Press Brake. Part II. *Sheet Metal Worker,* v. 39, Aug. 1948, p. 38-39.

Method of setting dies. Suggestions on maintenance and uses.

19a-182. Forging Die Design. Straightening Dies. John Mueller. *Steel Processing,* v. 34, Aug. 1948, p. 409-411, 426.

Some of the processes being employed by forgers to straighten warped and distorted forgings and some of the factors responsible for warp and distortion when forging, trimming and heat treating these parts.

19a-183. Hard Die Inserts Increase Die Life, Cut Down-Time and Decrease Cost Per Unit. Frederick Lovell. *Steel,* v. 123, Aug. 23, 1948, p. 108.

How applications of the principle of using hard die inserts to increase production per die change often result in considerable savings in die and installation costs.

19a-184. Cracks in Presses Repaired Quickly. J. W. Hillhouse. *American Machinist,* v. 92, Aug. 26, 1948, p. 73-76.

Various applications of "metalock."

19b—Ferrous

19b-95. Progressive Dies Help Chevrolet Meet Demand for Heavy Gage Parts. P. D. Aird. *Modern Industrial Press,* v. 10, July 1948, p. 13-14,18.

19b-96. Unique Hulson Draft Gear Involves Forming & Welding. Walter Rudolph. *Modern Industrial Press,* v. 10, July 1948, p. 34, 36, 38.

Job that primarily involves forming and welding of steel tubing and plate, replacing castings in heavy-duty parts for railway-car understructure.

19b-97. Forging a Miniature Crankshaft. John Mueller. *Industrial Heating,* v. 15, July 1948, p. 1132, 1134.

Forging an alloy-steel crankshaft for a miniature gasoline motor. A typical example of hot working small forgings on closed impression dies.

19b-98. World's Largest Mechanical Forging Press. *Steel Processing,* v. 34, July 1948, p. 356-357.

800-ton press to be used for the mass production of automobile crankshaft forgings.

19b-99. Press-Fabricating Pipe on Converted 36-Foot Press and Specially Designed Welding Mill. *Steel,* v. 123, July 26, 1948, p. 84, 87.

Equipment and procedures.

19b-100. How Packard Whips Tough Forging Jobs. George Daschke and Harold Lawson. *American Machinist,* v. 92, July 29, 1948, p. 73-77.

Solution of some unusual but typical problems.

19b-101. Mile-a-Minute 5-Strand Tandem Mill Now in Operation. A. J. Winchester. *Electrical Engineering,* v. 67, Aug. 1948, p. 742-746.

Tin-plate cold reduction mill. Emphasizes electrical controls.

19b-102. The Manufacture of Bolts and Nuts. R. C. Rhoades. *Steel Processing,* v. 34, July 1948, p. 351-355.

A clear description of the various methods and equipment used. This installment deals with steel required and its preliminary treatment; cold heading; hot forging of bolts; and two of the five methods for nut manufacture—cold punching and cold forging. (To be continued.)

19b-103. Large Stainless Steel Tank Heads Fabricated by Spinning. *Materials & Methods,* v. 28, Aug. 1948, p. 56-58.

Successful spinning of large 18:8 stainless steel tank heads on a production basis by the Milwaukee Metal Spinning Co.

19b-104. Skimmer Disks Produced Faster by Spinning. G. H. Cottrell. *American Machinist,* v. 92, Aug. 26, 1948, p. 78-80.

How 6000 cream-separator components per day are processed to close tolerances by high-production setup.

19c—Nonferrous

19c-17. Drawing Copper Wire at Western Electric's Tonawanda Plant. *Wire and Wire Products,* v. 23, July 1948, p. 589-593.

19c-18. Modern Developments in Metal Bellows; The "Hydroflex" equipment. *Aluminium and the Non-Ferrous Review,* v. 13, Jan.-March 1948, p. 15.

Brass bellows made by forming a thin walled tube under hydraulic pressure in a collapsible die. The metal flows transversely as pressure is applied, so that the bellows are formed in one continuous operation. The outstanding advantage is that any defective tube bursts under the high internal pressure. Also the unit is free from uneven stress distribution because of complete absence of any marking from tools used for spinning or rolling.

19c-19. Effect of Some Processing Variables on the Stress Required to Draw Tubular Parts. George Espey and George Sachs. *Transactions of the American Society of Mechanical Engineers,* v. 70, April 1948, p. 233-239.

Variations studied were in tube dimensions, contour and finish of the die and punch, temper and surface condition of the parts, and the lubricant for drawing tubular brass parts. Draw stress for a given reduction increased with decreasing die angle, this being the most important die variable. Radiused dies behaved in a manner similar to conical dies of the same contact area. Other die variables investigated had little effect upon draw stress. A number of lubricants were investigated, none of which excelled a 2% aqueous soap solution.

19d—Light Metals

19d-39. Spun Glass Aids in Metal Forming. *Aviation Week,* v. 49, July 26, 1948, p.27.

Use of new material, woven into blankets to simplify shaping magnesium sheets which must be worked when hot.

19d-40. Aluminum Goes to Press. Part II. (Concluded.) E. V. Sharpnack. *Tool & Die Journal,* v. 14, Aug. 1948, p. 72-74, 76-77.

Recommended procedures for forming, blanking and piercing, and work-hardening Al sheet.

19d-41. Hot Stretch-Forming of Aluminum Sheets. J. A. Johnson. *Machinery,* v. 54, Aug. 1948, p. 170-171.

Hot forming shows promise of eliminating tears or fractures thus reducing the number of pieces required and the forming operations necessary.

19d-42. Stretch Forming of Magnesium Parts. *Steel,* v. 123, Aug. 9, 1948, p. 94.

Stretch forming of magnesium sheets is aided materially by the use of spun-glass "blankets" to overcome friction between sheet and stretch block. The procedure of forming streamlined structures by stretching a sheet of metal over die forms has proved to be the most efficient way of manufacturing many complicated shapes.

19d-43. Flow of Metal in Rectangular Draws. (Continued). J. W. Lengbridge. *Tool Engineer,* v. 11, Aug. 1948, p. 23-26.

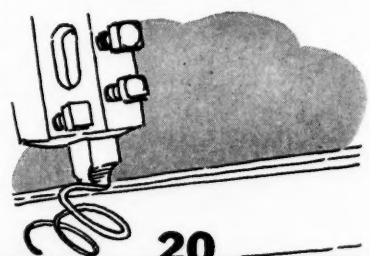
Further discussion of theory and practice of pressing aluminum. Blank development and flow retarding factors. Cause of wrinkles and puckers. (To be continued).

19d-44. Glass "Blanket" for Stretch Forming. Rex Heath. *Tool Engineer,* v. 11, Aug. 1948, p. 58.

Method and application. Uses a spun-glass sheet between metal and form blocks.

19d-45. Impact Extrusion Methods at Western Aluminum Plant. Harry Pierce. *Light Metal Age,* v. 6, Aug. 1948, p. 20, 22.

For additional annotations indexed in other sections, see:
3b-111; 4b-55; 22b-238.



20
MACHINING and MACHINABILITY

20a—General

20a-295. Foire De Paris, new series, 1948. P. Grodzinski. *Industrial Diamond Review,* v. 8, July 1948, p. 205-207, 210-214.

Machine tools, especially those utilizing diamonds, exhibited at above exhibition.

20a-296. Continuous Metal Cut-Off Methods. H. J. Chamberland. *Western*

(Turn to page 46)

EXHIBITORS

Olsen Testing Machine Co., Tinius, Willow Grove, Pa. Booth 1529. Universal and tensile testing machines; small tools and instruments.

Optimus Equipment Co., Matawan, N. J. Booth 612. Washing, rinsing, pickling and drying equipment.

Organic Finishing, Booth 603. (See Finishing Publications, Inc.)

Osborn Manufacturing Co., Cleveland 14. Booth 631. Power and hand brushes.

P-Q

Packer Machine Co., Meriden, Conn. Booth 1710. Buffing machines and buffs.

Pangborn Corp., Hagerstown, Md. Booth 841. Hydro-Finish blast cleaning machine.

Park Chemical Co., Detroit 4. Booth 340. Heat treating materials.

Parker-Kalon Corp., New York 14. Booth 1949. Screws.

Partlow Corp., New Hartford, N. Y. Booth 1936. Temperature controls; recorders; thermometers; valves and timers.

Penton Publishing Co., Cleveland 13. Booth 1744. Technical magazines and books.

Pereny Equipment Co., Columbus 8, Ohio. Booth 1752. Electric heat treating furnaces.

Philadelphia Electric Co., Philadelphia 5. Booth 1857. Public utilities.

Philadelphia Quartermaster Industrial Mobilization District, Philadelphia 45. Booth 1715. Soldiers' equipment; ordnance items.

Phillips Mfg. Co., Chicago 45. Booth 711. Vapor degreasers.

Physicists Research Co., Ann Arbor, Mich. Booth 125. Surface analysis equipment.

Plastic Metals Division, National Radiator Co., Johnstown, Pa. Booth 606. Metal powders and parts.

Poole, C. A., Tulsa, Okla. Booth 1755.

Porter-McLeod Machine Co., Inc., Hatfield, Mass. Booth 1921. Polishing and finishing machines; abrasive cut-off machines.

Precision Shapes, Inc., Suffern, N. Y. Booth A-1557. Milling shapes.

Precision Welder & Machine Co., Cincinnati 10. Booth 624. Resistance welding machines.

Production Machine Co., Greenfield, Mass. Booth 1327. Polishing, buffing and deburring machines.

Pyrometer Instrument Co., Inc., Bergenfield, N. J. Booth 727. Optical, radiation and immersion pyrometers.

Quigley Co., Inc., New York 17. Booth 738. Refractories and insulation; furnaces.

R

Radio Corp. of America, RCA Victor Division, Camden, N. J. Booth 110. Electron microscopes; vacuum gage.

Ransome Machinery Co., Dunellen, N. J. Booth 1628. Welding positioners and turning rolls.

Raybestos-Manhattan, Inc., (See Manhattan Rubber Division.)

Reed Engineering Co., Carthage, Mo. Booth 1858 and 718. Power-driven turning rolls for welding.

Reeves Pulley Co., Philadelphia 4. Booth 1435. Pulleys and belts in metalworking and plant equipment.

Reinhold Publishing Corp., New York 18. Booth 107. Copies of *Materials & Methods.*

Revere Copper & Brass, Inc., New York 17. Booth 702. Applications of Revere metal, copper and brass, aluminum.

Revista Industrial. Booth 1744. (See Penton Publishing Co.)

Reynolds Metals Co., Louisville 1, Ky. Booth 1632. Aluminum primary products and end products.

Richards Co., J. A., Kalamazoo 60F, Mich. Booth 628. Bending and cutting machines.

Riverside Metal Co., Riverside, N. J. Booth 1758. Nickel silver; phosphor bronze; beryllium copper; cupronickel.

Rolock, Inc., Fairfield, Conn. Booth 1432. Fabricated heat and corrosion resistant alloys for furnace parts; metalworking trades.

S

Safety Clothing & Equipment Co., Cleveland 3. Booth 837. Protective clothing and safety equipment.

Salkover Metal Processing, New York and Chicago. Booth A-1559. Brazing and soldering techniques.

Sargeant & Wilbur, Inc. Pawtucket, R. I. Booth 1537. Industrial electric and fuel-fired furnaces; atmosphere generators.

Scherr Co., Inc., George, New York 12. Booth 417. Microscopes; gages; precision measuring tools.

Schrader's Son, A., Div. Scovill Mfg. Co., Inc., Brooklyn 17, N. Y. Booth 1835. Pneumatic machine controls.

Sciaky Bros. Inc., Chicago 38. Booth 1619. "Three-Phase" welders.

Scott & Son, Inc., C. U., Rock Island, Ill. Booth 408. Steel heat treating; tool hardening.

Scovill Manufacturing Co., Waterbury 91, Conn. Booth 950. High speed brass rod.

Selas Corp. of America, Philadelphia 34. Booth 1401. Heating furnaces and burners.

(Turn to page 47)

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Machinery and Steel World, v. 39, July 1948, p. 96-98, 120-121.

Various abrasive-wheel and bandsaw techniques.

20a-297. Cutting-Off Blades for Screw Machines. Clifford C. Stone. *Western Machinery and Steel World*, v. 39, July 1948, p. 104-105,128.

Proper design. The cutting-off operation is said to be the source of most of the troubles encountered on hand and automatic screw machines. The two major causes for failure of a cutting-off tool, namely, incorrect clearance angles and improper setup.

20a-298. Part Made Complete Through Intricate Recessing Operation. Part 5. A. F. Parker. *Screw Machine Engineering*, v. 9, July 1948, p. 21-24.

Details of tooling for complex recessed camera part in which concentricity of one thread to another is held to extremely close limits.

20a-299. Table of Corrected Tool Diameters for Non-Top-Rake Circular Tools 2 3/8″ Diameter—1/8″ Offset. Roy M. Spaulding. *Screw Machine Engineering*, v. 9, July 1948, p. 26-28.

20a-300. Pitfalls to Avoid in Tooling Screw Machines. Part Four. Noel Brindle. *Screw Machine Engineering*, v. 9, July 1948, p. 30-33.

Turning after drilling where there is a thin wall between a drilled hole and a turned diameter; and turret knurling stock smaller than ⅛-in. diameter.

20a-301. Machine of the Industry: Standard No. 2 Automatic Screw Machine. *Screw Machine Engineering*, v. 9, July 1948, p. 34-35.

20a-302. Screw Machine Engineering Data Sheet: Comparison Chart of Cemented Carbide Grades. *Screw Machine Engineering*, v. 9, July 1948, p. 36.

20a-303. Stock Feed Mechanism Uses Carbide Rolls. *Screw Machine Engineering*, v. 9, July 1948, p. 37.

Under actual production tests, solid carbide feed rolls, used in conjunction with a roller feed and timing mechanism on a B. & S. automatic screw machine are lasting more than ten times as long between reconditioning grinds as did the steel rolls formerly used.

20a-304. Stock Ends. *Screw Machine Engineering*, v. 9, July 1948, p. 41.

Single Bit Tool Holder, Daniel A. Hennick; Magnet Removes Small Diameter Bar Ends, Robert H. Knowles; Useful Box Tool Grind, H. Smith; and Adjustable Gage, Raymond J. Braski.

20a-305. A Simple Adjustable Reamer. *Machinery Lloyd*, (Overseas Edition), v. 20, July 3, 1948, p. 113.

20a-306. Flexible Transfer Machines. *Automotive Industries*, v. 99, July 15, 1948, p. 34-36, 78, 82.

Units for automatic machining of cylinder heads and blocks.

20a-307. Shop Shots From International Harvester Indianapolis Works. *American Machinist*, v. 92, July 29, 1948, p. 78-79.

20a-308. Sapphire Tip Bores Bushing. C. C. Scott. *American Machinist*, v. 92, July 29, 1948, p. 83.

Used for boring a brass bushing at lowered cost. The tip is bonded to the tool shank by a process developed by Sapphire Products Division, Elgin National Watch Co.

20a-309. Practical Ideas. *American Machinist*, v. 92, July 29, 1948, p. 108-112.

Roller-grip pneumatic attachment feeds strip stock to punch press (S. H. Pearson); flat forming tool in two parts is made and sharpened more quickly (Stephen E. Hancock); rotating drill-press table speeds lapping (Harold Greuel); milling setup to help cutter around die corner (D. Moore); geared disk-cam holder matches feed and rotation for milling (Clifford T. Bower); replacement of headstock bearings in old lathe for shell-reaming setup (Frederick C. Lurz); draft angle ground on cutter for milling out casting dies (John P. Harrington); and other miscellaneous shop hints.

20a-310. Factors Influencing the Quality of Ground Gears and Worms. Part II. L. P. Tarasov. *Modern Machine Shop*, v. 21, Aug. 1948, p. 144-146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168.

Recommendations for production and metallurgical factors involved.

20a-311. Ideas From Readers. *Modern Machine Shop*, v. 21, Aug. 1948, p. 198, 200, 202, 204, 206.

Adjustable Boring Bar, D. E. McDonald; Hinged Finger Facilitates Setting Up Gears, John E. Reeve; Perfect Control Beam Compass, Bert Charlesworth; and Handy Tapered Gage for Checking Drilled Holes, A. H. Waychoff.

20a-312. Mechanical Activation — a Newly Developed Chemical Process. M. C. Shaw. *Journal of Applied Mechanics*, v. 15. *(Transactions of the American Society of Mechanical Engineers*, v. 70), March 1948, p. 37-44.

In the course of a fundamental study of metal cutting, it was found that a cutting fluid encounters a rather unusual combination of conditions at the point of a cutting tool. The fluid is subjected to high local pressures and temperatures and nascent highly stressed metal surfaces. This combination of conditions will, in general, promote a chemical reaction. How the metal-cutting process may be employed in the preparation of organometallic compounds. The metal involved is cut in the presence of the other reactants, thus utilizing the surface produced to start the reaction. 16 ref.

20a-313. Helical Flute Grinding Attachment. J. Turner. *Machinery* (London), v. 73, July 1, 1948, p. 7.

20a-314. Lathe Adapted for Turning Special Dowel-Pins. *Machinery* (London), v. 73, July 1, 1948, p. 10-11.

20a-315. Optical Form Grinding. *Machinery* (London), v. 73, July 8, 1948, p. 37-40.

Control of a form-grinding operation by directly comparing an optically enlarged image of the work with an enlarged-scale drawing, as developed in the U. S.

20a-316. Jig Grinding. W. Boneham. *Aircraft Production*, v. 10, Aug. 1948, p. 282-284.

Process for accurately finishing bores, slots and other internal contours in hardened materials.

20a-317. Ground Finishes Eliminate Lapping. H. J. Chamberland. *Aero Digest*, v. 57, Aug. 1948, p. 62, 65, 120-121.

Important factors in obtaining best results from surface grinders.

20a-318. What to Watch in Metal-Polishing Costs. E. C. Bleam. *American Machinist*, v. 92, Aug. 12, 1948, p. 87-89.

Proper application of wheel, abrasive, adhesive and method of wheel setup is essential to low-cost polishing.

20a-319. "All-Depth" Drills for Shallow and Deep Hole Drilling. Fred W. Lucht. *Tool & Die Journal*, v. 14, June 1948, p. 38-41, 62. (To be continued.)

Previously abstracted from *Machinery*, v. 54, June 1948, p. 156-160. See item 20a-227.

20a-320. Deep-Drilling of Crankshafts on Transfer Type Machines. Charles H. Wick. *Machinery*, v. 54, Aug. 1948, p. 153-156, 158.

The angular, vertical, and horizontal holes are progressively drilled as the crankshafts are automatically transferred through the machine, a production of 60 crankshafts per hour being attained.

20a-321. Broach Requirements for Spline Shafts and Fittings. Harry H. Gotberg. *Mechanical Engineering*, v. 70, Aug. 1948, p. 680-682.

Broaches and broaching of splines. Many elements have to be considered in the processing of spline shafts and fittings. How broach-tool costs can be minimized by adoption of a standardized program.

20a-322. Getting the Best Results From Abrasive Wheel Cutting. J. C. Arndt. *Production Engineering & Management*, v. 22, Aug. 1948, p. 50-54.

Many factors, including material saving, cost reduction, and less operation time, recommend abrasive-wheel cutting for first operation work in mass-production plants.

20a-323. Product Output Boosted by Special-Purpose Machine. *Production Engineering & Management*, v. 22, Aug. 1948, p. 67.

Production rate for machining various types of industrial air-compressor cylinders has been more than tripled by this special-purpose machine tool. A unit of this type, when equipped with an all-electric, adjustable-speed drive system, provides certain key advantages which contribute markedly to consistent maintenance of quality control standards and repetitive uniformity in the production of parts.

20a-324. Rapid Machining Operations on Die Castings. *Iron Age*, v. 162, Aug. 19, 1948, p. 162.

Many zinc die-castings produced require minor machining operations which are done rapidly because little metal has to be removed and good tooling is applied.

20a-325. Feinschleifen und Läppen von Messflächen. (Fine-Grinding and Polishing of Surfaces to Close Tolerances.) W. Lätzig. *Metalloberfläche*, v. 1, July 1947, p. 161-163.

Advantages and disadvantages of hand and machine polishing, fine grinding with respect to accuracy of dimension and form, quality of surface, and resistance to wear and corrosion. 18 ref.

20a-326. A New Method of Drill Sharpening. (In Russian.) N. M. Neklepaev. *Stanki i Instrumenti* (Machines and Tools), no. 5, May 1948, p. 10-13.

The cutting ability of any commonly-used drill may be increased 30 to 40% by additional grinding. Method of additional grinding.

20a-327. Balanced Surface Speeds Through Spindle Speed Changes. C. H. Wummel. *Screw Machine Engineering*, v. 9, Aug. 1948, p. 20-23.

Control of appliable spindle speeds to attain highest production. Operation chart showing best setup for a worm shaft which is offered as subject for machining.

20a-328. Table of Corrected Tool Diameters for Circular Form Tools With 5° Top Rake. Roy M. Spaulding. *Screw Machine Engineering*, v. 9, Aug. 1948, p. 24-27.

Direct-reading table, range of which covers changes in diameter from 0.002 to 1.000 in.

20a-329. Pitfalls to Avoid in Tooling Screw Machines. Part 5. Noel Brindle. *Screw Machine Engineering*, v. 9, Aug. 1948, p. 28-31.

Additional problems which the screw machine engineer encounters daily. Depth of tap drill hole, cut-off tool width, and oversize feed tube for light work.

(Turn to page 48)

EXHIBITORS

Sentry Co., Foxboro, Mass. Booth 413. Hardening furnace; tube combustion furnace; diamond blocks and accessories.

Shell Oil Co., Inc., New York 20. Booth 1823. Industrial lubricants; cutting oils; drawing compounds.

Simonds Saw & Steel Co., Fitchburg, Mass. Booth 1822. Saws; shears; knives; files.

Simonski, Gilbert S., Philadelphia 8. Booth 1351. Precision machine and tool work.

Snap-On Tools Corp., Kenosha, Wis. Booth 1955. Wrenches and hand tools.

Socony-Vacuum Oil Co., Inc., New York 4. Booth 1720. Cutting and grinding oils; lubricants.

South Bend Lathe Works, South Bend 22, Ind. Booth 1866. Lathes; drill presses; shapers.

Southern California Edison Co., Ltd., Los Angeles. Booth 1344. Utilities.

Southern California Gas Co., Los Angeles. Booth 1344. Utilities.

Spencer Turbine Co., Hartford 6, Conn. Booth 217. Vacuum cleaning equipment; turbo compressors.

Sperry Products, Inc., Danbury, Conn. Booth 139. Ultrasonic instruments for detection of flaws and measuring thickness.

Stearns-Roger Manufacturing Co., Denver 2, Colo. Booth 1321. Flame hardening machine.

Steel. Booth 1744. (See Penton Publishing Co.)

Stokes Machine Co., F. J., Philadelphia 20. Booth 1920. Powder metal presses.

Stoody Co., Whittier, Calif. Booth 938. Hard facing alloys.

Stuart Oil Co., Ltd., D. A., Chicago 23. Booth 211. Cutting and grinding oils.

Sun Oil Co., Philadelphia 3. Booth 615. Petroleum products for the metalworking industry.

Superior Tube Co., Norristown, Pa. Booth 1829. Small tubing of many metals.

Surface Combustion Corp., Toledo 1. Booth 1416. Heat treating furnaces and equipment.

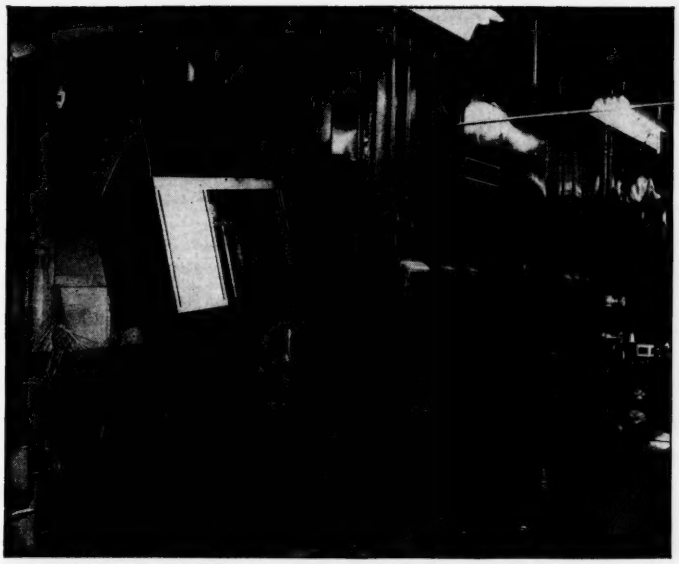
T

Tabor Manufacturing Co., Philadelphia 35. Booth A-1565. Foundry equipment; abrasive cut-off machines.

Taco West Corp., Chicago 16. Booth 904. Automatic control equipment; pyrometers.

Tatnall-Young Testing Machine Corp., Philadelphia 44. Booth 104. Testing instruments; strain gages.

(*Turn to page* 49)



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20a-330. Introduction to Cutting Tools. Part I. A. E. Rylander. *Tool Engineer,* v. 11, Aug. 1948, p. 59-60.

Proper use of planer tools. Clearance angles and proper rake. (To be continued.)

20a-331. Air Motors Operate Scroll Chucks on Milling Fixture. Leonard C. Heinlein. *American Machinist,* v. 92, Aug. 26, 1948, p. 77.

Setup giving high production in milling slots in ball-bearing housings for Link-Belt pillow blocks. These cast-iron housings are milled four-at-a-time on a four-spindle Cincinnati Hydro-Tel profile miller. Work traverse in relation to the cutters is controlled by a slotted cam plate and a profile attachment at the right of the machine.

20a-332. Sharpening Carbide Reamers. I, II, and III. *American Machinist,* v. 92, Aug. 26, 1948, p. 123, 125, 127.

Conventional sharpenings, special sharpenings, and sharpening procedure.

20b—Ferrous

20b-58. Connecting Rod Machining Time and Cost Cut 20 Per Cent by Careful Utilization of Equipment and Shop Area. *Steel,* v. 123, Aug. 2, 1948, p. 84-86.

Methods, equipment and layout.

20b-59. Progress Report No. 1 on Tool-Chip Interface Temperatures. K. J. Trigger. *Transactions of the American Society of Mechanical Engineers,* v. 70, Feb. 1948, p. 91-98.

Some of the results of a series of experiments on the temperature developed at the contacting surface of the tool and the chip. This tool-chip interface temperature is referred to as the "cutting" temperature. Determination was by means of the Herbert-Gottwein tool-work thermocouple in which the steel workpiece constitutes one member of a thermocouple and the cemented-carbide insert the other member.

20b-60. Special Tools Bore Aluminum Castings at High Speed. Ben C. Brosheer. *American Machinist,* v. 92, Aug. 12, 1948, p. 90-92.

A continuous cut at nearly 3400 f.p.m. for contour-boring the inside of pressure cookers. Special tools and chuck which make this possible.

20b-61. High-Speed Planing With Carbide Tools. W. P. Coomey. *Machinery,* v. 54, Aug. 1948, p. 141-146.

Carbide tools of improved design permit planing of semi-steel castings at speeds up to 300 ft. per minute with feeds of from 3/64 to ⅛ in. and depths of cut up to 1 in.

20d—Light Metals

20d-17. The Broaching of Aluminum and Magnesium. Harry Gotberg. *Light Metal Age,* v. 6, Aug. 1948, p. 12-16, 27.

Equipment, broach design, and machine operation.

For additional annotations indexed in other sections, see: 27a-110-113-116.

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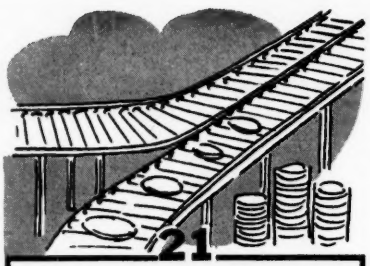

MISCELLANEOUS FABRICATION

21a—General

21a-109. Chain. N. I. Bond-Williams. *Journal of the Birmingham Metallurgical Society,* v. 28, June 1948, p. 142-146; discussion, p. 147-152.

Manufacture of knotted chain—in which the links are twisted together instead of being welded into continuous ovals or circles.

21a-110. Stepping-up Automatic Calculator Production in San Leandro. *Western Metals,* v. 6, July 1948, p. 24-25.

Procedures and equipment.

21a-111. Fresno Equips the Wine Industry. Ralph G. Paul. *Western Machinery and Steel World,* v. 39, July 1948, p. 84-87, 107.

Equipment and procedures used for production of miscellaneous wine-industry equipment.

21a-112. Precision Control Systems. Gordon B. Ashmead. *Western Machinery and Steel World,* v. 39, July 1948, p. 88-91.

Manufacture of above equipment for automatic control of gas-fired heating appliances.

21a-113. Submersible Electric Motors Pump California's Water. Paul Graham. *Western Machinery and Steel World,* v. 39, July 1948, p. 92-95, 117.

Production of these pumps.

21a-114. Precision Die Work Pays Off. J. G. Blane. *Western Machinery and Steel World,* v. 39, July 1948, p. 99-101, 128.

Equipment and procedures.

21a-115. Coming — Kitchen Angels. *Western Machinery and Steel World,* v. 39, July 1948, p. 102-103.

Production of new type dishwashing machine—the "Kitchen Angel". It consists of a deep metal tub and lid, a spray, two couplings, and two other fittings, and a length of hose. These parts are then assembled.

21a-116. How Renault Has Modernized Its Plant to Triple Output. W. F. Bradley. *Automotive Industries,* v. 99, July 15, 1948, p. 24-26, 60, 62, 64.

Retooling program for production of a four-passenger, rear-engined car.

21a-117. Sheet Metal Operations in Aircraft Supply Plant Revolve About "Air Power". *Steel,* v. 123, July 26, 1948, p. 97, 100.

Miscellaneous applications of compressed air.

21a-118. Improved Material for Magnetic Amplifiers. *Electronics,* v. 21, Aug. 1948, p. 128, 130, 164, 166.

Summary of four papers presented at symposium on magnetic materials, Washington, D. C., June 15, 1948. Production of a suitable core material by cold reduction and annealing of "Permenorm 5000-Z" at Naval Ordnance Laboratory was described by G. W. Elmen, E. A. Gangler, and E. Both. Includes melting, casting, and forming procedure. A. O. Black described characteristics of the electromagnetic amplifiers thus obtained. Frank Logan reviewed development of saturable reactors and magnetic amplifiers. Otto Jensen showed how efficient electromechanical rectifiers could be built using saturable reactors.

21a-119. Visits to Works. *Iron and Steel,* v. 21, July 1948, p. 335-342.

Various procedures at following English plants: Ealing Park Foundry, Ltd.; Foundry at R. & A. Main, Ltd.; Fraser and Chalmers Engineering Works; and the Ford Motor Co. works at Dagenham.

21a-120. The First Automatic Radio Factory. *Fortune,* v. 38, Aug. 1948, p. 90-93.

Revolutionary British machine which builds three radio circuits a minute without human touch. Steps include milling, grit-blasting, inspection, metalizing, and assembly.

21a-121. Fuel Injection Equipment. *Automobile Engineer,* v. 38, July 1948, p. 255-263.

Layout of the main machine shop, and machining methods for pump housings, camshafts, and plunger and barrel units. (To be continued.)

21a-122. A One-Step Assembly. *Applied Hydraulics,* v. 1, Aug. 1948, p. 10-11, 24.

A specialty jobber of electrical equipment gained in accuracy and speed of assembly, reduced scrap and changeover time and increased production by the use of hydraulically-operated presses of their own design.

21a-123. Tailored-to-the-Job Machines. Ed. Karpick. *Steel,* v. 123, Aug. 9, 1948, p. 74-77.

Modern machines supplied by other manufacturers and special equipment designed and built which enables semiskilled workers to perform a large number of jobs. Conveyers, trucks and hoists used extensively to decrease manual handling and speed production.

21a-124. The Works of the David Brown Organization. Part III and Part IV. (Concluded.) *Engineer,* v. 186, July 16, 1948, p. 67-69; July 23, 1948, p. 78-81.

Manufacture of large gear wheels and operations at the Penistone Foundry which specializes in production of high tensile, corrosion and heat resisting alloy steel castings weighing up to 7½ tons.

21a-125. Alarm Clock Manufacture. *Machinery* (London), v. 73, July 22, 1948, p. 87-95.

Intensive methods employed by Smiths English Clocks, Ltd.

21a-126. Motor Industry Methods Applied to Hopper-Car Manufacture. *Steel,* v. 123, Aug. 16, 1948, p. 90-92.

Introduction of complete welding operations and a new assembly line technique has resulted in an extraordinary production rate of 25 or more 70-ton coal hopper cars daily.

21b—Ferrous

21b-62. Chains. P. Jump. *Journal of the Birmingham Metallurgical Society,* v. 28, June 1948, p. 128-132; discussion, p. 147-152.

Deals with wrought-iron chains, especially short-link chains. Requirements; design of links; chain materials; manufacture; examination and testing; and subsequent treatment and annealing.

21b-63. Arc-Welded Airscrew-Hubs. Clarence C. Mast, Paul F. Hackethal and Douglas W. Hamilton. *Aircraft Production,* v. 10, July 1948, p. 219-220.

Method for economical production.

21b-64. Mechanized Wheel Line Employs Automatic Methods to Build Au-

(Turn to page 50)

EXHIBITORS

Taylor-Winfield Corp., Warren, Ohio. Booth 1532. Resistance welding machines.

Technical Metal Processing, Inc., Cleveland 15. Booth A-1559. (See Salkover Metal Processing.)

Technical Publishing Co., Cleveland 13. Booth 440. (See Industrial Publishing Co.)

Tempil Corp., New York 11. Booth 309. Temperature-indicating crayons, pellets and paint.

Temple University, Philadelphia. Booth A-1550, Educational facilities.

Tennant Co., G. H., Minneapolis 11. Booth 1336. Floor cleaning and maintenance machines.

Texas Co., New York 17. Booth 1563. Cutting coolants and lubricants.

Tide Water Associated Oil Co., New York 4. Booth 1436. Industrial lubricants; cutting oils.

Timken Roller Bearing Co., Canton 6, Ohio. Booth 446. Seamless steel tubing; steel products.

Tinnerman Products, Inc., Cleveland 13. Booth 336. Speed nuts and speed clips.

Torit Manufacturing Co., St. Paul 2. Booth 760. Dust collecting equipment.

Torrington Manufacturing Co., Torrington, Conn. Booth 632. Spring coilers; metal slitting machines.

Tri-Clover Machine Co., Kenosha, Wis., Booth 1923. Stainless steel and cupronickel fittings and valves; pumps, tubing.

U-V

Udylite Corp., Detroit 11. Booth 214. Plating and polishing equipment.

Union Carbide & Carbon Corp., New York 17. Booth 1602. (See National Carbon Co., Haynes Stellite Co., Linde Air Products Co.)

Upton Electric Furnace Division, Detroit. Booth 1525. Industrial furnaces; salt baths.

U. S. Hoffman Machinery Corp., New York 3. Booth 838. Industrial cleaning and maintenance equipment.

U. S. Naval Engineering Experiment Station, Annapolis, Md. Booth 1952. (See Navy Dept.)

Vanadium Corp. of America, New York 17. Booth 117. Vanadium alloys, metals and chemicals.

Vapor Blast Mfg. Co., Milwaukee 3. Booth 1967. Liquid honing equipment for die finishing.

Vacuum Equipment Division. (See Distillation Products, Inc.)

Vascoloy-Ramet Corp., North Chicago. Booth 101. (See Fansteel Metallurgical Corp.)

Webb Corp., Webb City, Mo. Booth 718. (See Edward A. Lynch Machinery Co.)

Weiger Weed and Co., North Chicago, Ill. Booth 101. Resistance welding equipment and electrodes.

Welders Supply Co., Philadelphia. Booth A-1567. Welding distributors.

Welding Engineer, New York 18. Booth 1844. Magazines; books; reprints.

Wells Manufacturing Corp., Three Rivers, Mich. Booth 161. Band saw machines.

Wells, Inc., Martin, Los Angeles 1. Booth 1455. Electrodes and electrode holders.

Westinghouse Electric Corp., Pittsburgh 30. Booth 806. Welding machines; pure metals; magnetic materials; brazing alloys.

Whistler & Son, Inc., S. B., Buffalo 17, N. Y. Booth 1502. Adjustable perforating dies for metal.

Whiting Corp., Quickwork Division, Harvey, Ill. Booth 718. (See Edward A. Lynch Machinery Co.)

Willys-Overland Motors, Inc., Drop Forge Division, Toledo 1. Booth 1644. Forgings.

Wilson Mechanical Instrument Co., Inc. New York 17. (Associated with American Chain and Cable Co., Inc.) Booth 116. Rockwell hardness testers; Tukon tester; Knoop indenter.

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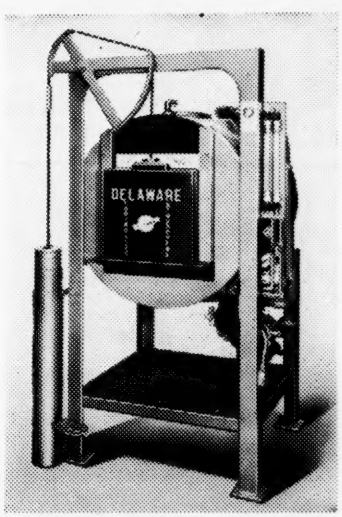

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tomobile Components. *Steel,* v. 123, July 26, 1948, p. 66-68.

Thoroughly mechanized setup for fabricating automobile wheels used to turn out completed units with a minimum of manual handling. Forming, welding, trimming, materials handling, and inspection.

21b-65. Million and a Half Automotive Bearings a Month. Joseph Geschelin. *Automotive Industries,* v. 99, Aug. 1, 1948, p. 26-29, 92.

High production setup in ball-bearing plant.

21b-66. The Works of the David Brown Organization. *Engineer,* v. 186, July 2, 1948, p. 4-6; July 9, 1948, p. 33-35.

Procedures and equipment of British gear and power-transmission-unit manufacturer. (To be continued.)

21d—Light Metals

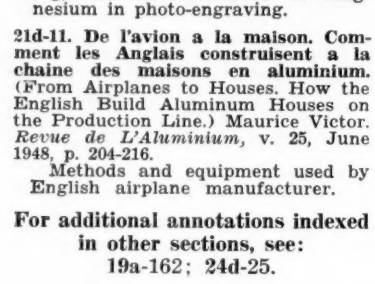
21d-10. The Shop Processing of Magnesium. H. E. Swayze. *Photoengravers Bulletin,* v. 37, July 1948, p. 18-28.

Production of magnesium, history of magnesium in photo-engraving, and characteristics of magnesium in photo-engraving.

21d-11. De l'avion a la maison. Comment les Anglais construisent a la chaine des maisons en aluminium. (From Airplanes to Houses. How the English Build Aluminum Houses on the Production Line.) Maurice Victor. *Revue de L'Aluminium,* v. 25, June 1948, p. 204-216.

Methods and equipment used by English airplane manufacturer.

For additional annotations indexed in other sections, see:
19a-162; 24d-25.



22a—General

22a-166. Novel Developments in Design and Operation of A.C. Arc-Welding Plant. E. C. Davies. *Transactions of the Institute of Welding,* v. 2, June 1948, p. 92-96.

Some recent developments and a few investigations in the experimental stage.

22a-167. Argonarc Welding: Review of Progress. R. R. Sillifant. *Transactions of the Institute of Welding,* v. 2, June 1948, p. 114-118.

Previously abstracted from *Welding,* v. 16, Feb. 1948, p. 53-60. See item 22a-81, 1948.

22a-168. Flash Butt Welding. Part III. S. G. E. Nash, H. Brooks, and M. A. Garnett. *Aircraft Production,* v. 10, July 1948, p. 243-247.

Post-welding tests and results; future prospects.

22a-169. How Metal Parts Are Joined in Electric Brazing Furnaces. R. E. Jones. *Western Metals,* v. 6, July 1948, p. 28-29.

Joining of miscellaneous metal parts by electric-furnace copper brazing of steel and by localized silver brazing.

22a-170. Influence of Welding on Marine Engine Design. J. A. Dorrat. *Welding,* v. 16, July 1948, p. 276-283.

Present trends in application of welded design to modern engine structures. Electrodes, choice of materials, joint arrangement as well as salient features and advantages of fabricated construction.

22a-171. Keeping the Mills Rolling. Frank J. Gaydos. *Welding Engineer,* v. 33, Aug. 1948, p. 35-38.

Hard facing and buildup practices as important phases of welding maintenance in a steel mill.

22a-172. Bits for New Oil Wells. Gerald Eldridge Stedman. *Welding Engineer,* v. 33, Aug. 1948, p. 40-42.

Applications of welding procedures in fabrication of deep-well rock bits.

22a-173. Gar Wood Adapts Automatic Welding. Clyde B. Clason. *Welding Engineer,* v. 33, Aug. 1948, p. 46-49, 60.

Use in multiple-duty fabrication with three submerged-melt welding fixtures to speed production of components for road-building equipment.

22a-174. How to Choose and Use the Correct Electrode Properties, Diameter, Polarity, Current, Voltage Electrode Angle, Penetration, Travel Speed. Lew Gilbert. *Industry and Welding,* v. 21, Aug. 1948, p. 30-32, 34, 37.

First of three installments.

22a-175. Welded Studs Cut Costs and Speed Work on Corrugated Metal Roofing Job. Robert C. Friedly. *Engineering News-Record,* v. 141, Aug. 5, 1948, p. 88-89.

Methods of applying corrugated sheet-metal roofing and siding to large building construction, involving the use of a special welding gun, which endwelds rivets to the steel purlins. The corrugated metal then is impaled over the rivets, which are upset and rounded off to form a weather-tight job.

22a-176. Questions fondamentales en matiere de constructions soudées. (Fundamental Questions Concerning Welded Structures.) F. Campus. *Schweizer Archiv,* v. 14, May 1948, p. 129-137.

Symposium of the conference which took place February 1947 in Geneva covering all phases of mechanical testing of welded structures.

22a-177. Bibliography on Power Supply for Electric Welding, 1940-1947. *American Institute of Electrical Engineers,* June 1948, 10 pages.

Contains 71 references prepared by the A.I.E.E. Technical Committee on Electric Welding.

22a-178. Welding and Low-Temperature Brazing of Air Conditioning and Refrigeration Parts. Ward Swarthout. *Steel Processing,* v. 34, Aug. 1948, p. 416-419.

Oxy-acetylene applications and design requirements.

22a-179. Dissimilar Metals Joined by Step Brazing Methods. I. S. Goodman. *Materials & Methods,* v. 28, Aug. 1948, p. 64-67.

Technique used in assembly of electronic radar tubes.

22b—Ferrous

22b-231. Modern Flash Butt Welded Steel Chain Cable. E. Wood. *Journal of the Birmingham Metallurgical Society,* v. 28, June 1948, p. 133-136; discussion, p. 147-152.

22b-232. Chains. J. G. Hopcraft. *Journal of the Birmingham Metallurgical Society,* v. 28, June 1948, p. 137-141; discussion, p. 147-152.

Small steel-chain manufacture by the slow butt welding process, especially by automatic machines.

22b-233. Some Aspects of Welding in the Heavy Chemical Industry. E. Fuchs and D. A. Godfrey. *Transactions of the Institute of Welding,* v. 2, June 1948, p. 97-108.

A variety of applications in construction and repair of equipment. Limited to ferrous metals.

22b-234. Recommendations for the Design of Arc Welded Mild Steel Machinery Constructions. *Welding Research,* v. 2 (Bound with *Transactions of the Institute of Welding,* v. 2), June 1948, p. 43r-53r.

Committee report.

22b-235. M. W. Kellogg Constructs and Welds Unusual Structure. *Victor Weld,* v. 4, July 1948, p. 11.

Fabrication of two propane decarbonizing towers, each 12 ft. in diameter, 75 ft. in length and 2⅝ in. in wall thickness.

22b-236. Manual Hidden Arc Welding Increases Welding Speeds. Ray Zeh. *Steel Processing,* v. 34, July 1948, p. 358-359.

Use in fabricating parts for steel heat treating furnaces. In some cases welding speeds have been increased by 100%.

22b-237. How Modern Tools and Methods Shorten the Work. *Sheet Metal Worker,* v. 39, July 1948, p. 35-36, 40.

Welding procedures for heavy-gage sheet-metal custom fabrication, and the multiple processing of several home appliances.

22b-238. Fabrication of New Westinghouse Alternating Current Welders. Floyd McKnight. *Modern Industrial Press,* v. 10, July 1948, p. 22, 26, 28, 38.

Welding and forming equipment and procedures.

22b-239. How to Weld Clad Steels. L. W. Williams. *Iron Age,* v. 162, July 22, 1948, p. 72-80; July 29, 1948, p. 82-88.

Step-by-step procedures for welding such cladding alloys as A.I.S.I. 405, 410, 430, 301, 302, 304, 316, 321, 347, nickel, monel, and Inconel. Weld preparation, weld metals, bead sequence, overlays, backup strips, metallurgical and physical factors, stress relief, hot working, and other factors affecting satisfactory welding. Second installment deals with the remaining types of stainless used most generally in cladding. Heat treating, types of joints, welding electrodes, and overlays.

22b-240. Now ACF Welds Hopper Cars Too—At 25 a Day. *American Machinist,* v. 92, July 29, 1948, p. 116-117.

22b-241. Welding Saves Million Dollars a Year at Harbor Steam Plant. Carl N. Barlow. *Power,* v. 92, Aug. 1948, p. 71-73.

22b-242. Welding Stresses Dissipated by Low-Temperature Process. T. W. Greene. *Steel,* v. 123, Aug. 9, 1948, p. 78-82.

Effective and practical method of eliminating high, residual welding stresses, or reducing them to negligible values, without distortion or deformation, is offered by fast, low temperature process. By heating plate on both sides of the weld to 350 to 400° F., correlated with proper cooling, the weld is temporarily strained and actually proof-tested.

22b-243. Repair, by Welding, of a Blade of the Hydro-Turbine of Svirsk Hydro-Electric Station. (In Russian.) A. A. Evdokimov. *Kotloturbostroenie* (Boiler and Turbine Manufacture), Jan.-Feb. 1948, p. 32.

Reports the successful repair of a broken blade of a hydro-turbine

(Turn to page 52)

A.S.M. Sauveur Memorial Room Is Dedicated

Two Views From Opposite Ends of the Sauveur Memorial Room Recently Dedicated at A.S.M. National Headquarters. In the view at left Dr. Sauveur's desk appears at the far end and his portrait is shown over the fireplace. In the right-hand view, the table in center background is intended for use as a conference and meeting table. A corner of the desk appears in the left foreground. Glass display cases are on sidewalls

Dedication of the Sauveur Memorial Room in the national headquarters of the American Society for Metals in Cleveland took place on Aug. 19 with simple but impressive ceremonies. Guest of honor at the dedication was Mrs. Albert Sauveur, widow of the famed Harvard professor whose memory this museum will honor.

In making a formal presentation of the room in behalf of the members of the American Society for Metals and the former students of Professor Sauveur, Marcus A. Grossmann, director of research for Carnegie-Illinois Steel Corp. and a past president of the American Society for Metals, briefly outlined the illustrious career of the distinguished scientist, long known as the "dean of American metallurgists".

Francis B. Foley, superintendent of research for the Midvale Co. and current president of the society, then presented a beautifully fashioned gold key to the 83-year-old widow as a memento of the affair. The bow of the key, as shown in the photograph below, is centered about a heart-shaped amethyst, and the bow itself, which is also set with diamonds, uses the initial "S" for its motif. The stem of the key has two diamond-studded collars joined by a golden cord wrapped around the stem, intended to symbolize the society's affection for Mrs. Sauveur.

In his presentation speech, Dr. Grossmann read the distinguished list of honors, medals and degrees that had been conferred on Dr. Sauveur by many foreign countries and universities. These certificates and medals had all been willed to the society by Dr. Sauveur on his death in 1939, together with his desk and chair, many autographed photographs of distinguished scientists, early issues of *The Metallographist*, founded by him in 1898, samples of some of his original metallographical researches, and other items closely concerned with his pioneering career.

The room itself is 40 x 15 ft., and is equipped with built-in glass display cases. Dominating the room is a large oil portrait of Dr. Sauveur painted by Alexander James.

Designed as a museum for the preservation of a variety of items of historical interest, the Sauveur Memorial Room also contains the early Rockwell hardness testing machine, donated by C. H. Wilson of Wilson Mechanical Instrument Co., and a complete set of the writings and publications of Dr. John A. Mathews, another pioneering metallurgist and an honorary member of the American Society for Metals, who was vice-president and director of research for Crucible Steel Co. of America at the time of his death in 1935.

The room also contains volumes 1 and 2 of the *Journal* of the American

(*Turn to page* 53)

A. S. M. President Foley Presents Key to Mrs. Sauveur. (Courtesy of Cleveland Plain Dealer)

Approximately Lifesize View of Jeweled Key Marking the Sauveur Museum Dedication

A fine Oil Painting of Dr. Sauveur Dominates the Room From Above the Mantlepiece

weighing about 10 tons and made of 14% chromium steel.

22b-244. Flame Cutting of Ferrous Metals. *Materials & Methods,* v. 28, Aug. 1948, p. 87, 89.

Various methods, and chart on cutting speeds and gas consumption for cutting steel plates.

22c—Nonferrous

22c-17. Copper-Aluminum Joints and Combination Materials Made by Upset Welding. R. T. Gillette. *Materials & Methods,* v. 28, July 1948, p. 70-73.

Specially designed equipment and technique. Applications.

22c-18. Welding Conductors to Commutator Decreases Danger of Motor Damage Caused by Overheat. *Steel,* v. 123, July 26, 1948, p. 94.

Method which eliminates the melting and displacing of solder used to connect wire conductors to the armature that sometimes results from overheating due to overload.

22c-19. Silver-Brazed Silverware. Fred M. Burt. *Welding Engineer,* v. 33, Aug. 1948, p. 50-52.

Procedures in producing sterling silver art objects.

22c-20. This Manufacturer Has Developed Some Interesting Carbon Arc and Silver Brazing Procedures on Brass and Copper. T. R. Boswell and W. H. Govier. *Industry and Welding,* v. 21, Aug. 1948, p. 26-29, 48.

22d—Light Metals

22d-42. Bobbin With Aluminum Flanges. *Modern Metals,* v. 4, July 1948, p. 22.

22d-43. New Welding Process for Light Alloy Bars and Sections. W. Bulian. *Welding,* v. 16, July 1948, p. 291-294. Translated from *Metallforschung,* v. 2, no. 7, 8, 1947.

Method adopted for wrought-aluminum alloys. Method consists of using special molds around pieces to be joined and pouring sufficient molten metal of the same alloy on until mold is properly filled.

22d-44. The Welding of Aluminium Alloys; Work of the Welding Research Team at the University of Birmingham. *Aluminium and the Non-Ferrous Review,* v. 13, Jan.-Mar. 1948, p. 5-6, 8, 10, 12-15.

Summarizes report on the following topics: properties of the Al-Si alloys at temperatures in the region of the solidus; hot-shortness of the Al-Si alloys with particular reference to welding; welding properties of an Al-Mg-Si-Mn alloy and alloys based thereon; hot shortness of the Al-Fe-Si alloys; hot shortness of the Al-Cu-Si alloys; an examination of the tensile properties of a number of Al-Cu-Si alloys; hot shortness of complex Al-Zn-Mg-Cu-Mn alloys; welding and hot shortness properties of the Al-Mg silicide alloys; hot shortness of the Al-Mg-Si alloys; and hot shortness of the more important binary Al alloys. Work by other investigators arising from the findings of the welding research team and a note on the terminology used in the investigations into cracking occurring at temperatures above the solidus during welding and casting.

22d-45. Cold Welding. *Automobile Engineer,* v. 38, July 1948, p. 277-278.

Technique developed by the General Electric Co., for joining, with pressure alone, ductile metals such as aluminum.

22d-46. Fluxless Soldering of Aluminum. Kenneth D. Kahn. *Welding Engineer,* v. 33, Aug. 1948, p. 54, 56, 58.

"Sonodizing", a newly developed technique for application of magnetostrictive vibratory forces to soldering of aluminum alloys.

22d-47. Joining Light-Alloy Sheet. *Aircraft Production,* v. 10, Aug. 1948, p. 265.

Simple pierce-riveting process for unstressed compenents.

22d-48. Uber ein Schweissverfahren zum Verbinden von Stangen und Profilen aus Legierungen der Gattungen MgAl 6 und MgAl 7. (A Method of Welding Structural Components of MgAl-6 and MgAl-7 Alloys.) Walter Bulian. *Metallforschung,* v. 2, July-Aug. 1947, p. 249-251.

A method of "cast-welding" the Mg-Al alloys, and the macro and microstructures of the welding zones. Tensile strengths of acetylene welded and "cast-welded" samples. 11 ref.

22d-49. Welding the Light Alloys. Part IV. *Light Metals,* v. 11, July 1948, p. 381-385.

Argonarc process, particularly as applied to aluminum and magnesium.

22d-50. Arc Welding of Aluminium and Its Alloys. A. Schärer. *Light Metals,* v. 11, July 1948, p. 397-403.

Theoretical and practical aspects of fluxing, the physics of the arc, and reactions at the metal surface. (To be continued.)

22d-51. Developments in Cold Welding. *Machinery Lloyd* (Overseas Edition) v. 20, July 17, 1948, p. 95-97.

Method and applications.

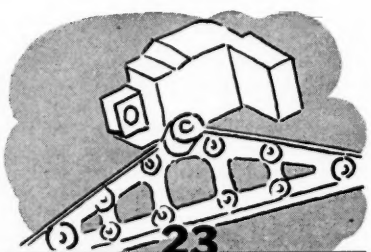
22d-52. Inert-Gas-Welded Aluminum Pipe Line. *Modern Metals,* v. 4, Aug. 1948, p. 16.

Construction of a 2-mile aluminum pipe line, all inert-gas welded, recently completed at Magnolia, Arkansas. The purpose in using this aluminum pipe was to eliminate corrosion which occurs in the steel pipe and which is caused by "sour" oil.

22d-53. Aluminum Fuel Tank Welding. *Steel,* v. 123, Aug. 23, 1948, p. 104, 106.

Recommendations designed to meet Underwriters' Laboratory requirements.

For additional annotations indexed in other sections, see: 19b-96; 24c-10.



23 APPLICATIONS

23a—General

23a-37. Materials at Work. *Materials & Methods,* v. 28, July 1948, p. 62-65.

Cast-Al trailer wheels; colored-plastic-coated metal tubing; nylon wheel bearings; monel roofing; magnesium transfer spouts for gasoline; glass cloth as aid in stretch-forming of Mg; phosphorescent-paint signs; and plastic insulation for magnetic coils.

23a-38. Turbine Blades That Resist Heat. Harold Woodhouse. *Aero Digest,* v. 57, Aug. 1948, p. 74, 76, 117.

Various materials available for production of these blades.

23a-39. The Manufacture of Bolts and Nuts. Part II. R. C. Rhoades. *Steel Processing,* v. 34, Aug. 1948, p. 423-426.

Production with automatic machinery.

23b—Ferrous

23b-37. Welded Steel Column Assemblies Designed by Alexander Ban Replace Wood Posts in Frame Houses Are Found More Efficient in Load Bearing, Installation and Cost. *Architectural Forum,* v. 89, July 1948, p. 115-116.

23b-38. The Growing Acceptance of Architectural Porcelain Enamel. M. J. Salton. *Finish,* v. 5, Aug. 1948, p. 29-31, 58.

Typical applications.

23b-39. New Developments in Tool Steels. Part II. George A. Roberts. *Tool & Die Journal,* v. 14, Aug. 1948, p. 48-50.

Molybdenum irons, W-Cr steel, vanadium in chromium hot work steels, and high speed steels. Table of high-speed-steel compositions. (To be continued.)

23b-40. Alloy Die Steels. L. Sanderson. *Metallurgia,* v. 38, July 1948, p. 147-152.

Dies for stampings, forgings and castings are subjected to heavy service conditions and to obtain economic production from them necessitates careful selection of the steels used in their manufacture and in their subsequent heat treatment. Steels for such and their treatment.

23b-41. Processing and Fabrication of Stainless Steel Sheet and Plate Products. Part VIII. (Continued.) I. C. Clingan and W. H. Braun. *Steel Processing,* v. 34, Aug. 1948, p. 412-415, 431.

Demonstrates the outstanding usefulness of the stainless steels. Principal uses for stainless steels in transportation, petroleum, paper, laundries, pharmaceutical, photographic, metal, cleaning and institutional equipments.

23b-42. Tool & Die Materials. Their Selection, Application and Necessary Treatment. Part I and Part II. *Steel,* v. 123, Aug. 16, 1948, p. 98-100, 102, 105; Aug. 23, 1948, p. 82-84, 86, 88, 90, 93.

Factors to be considered in the quick selection of toolsteels and carbide types to meet any given requirement. Sources, trade names and applications. Other pertinent data include chemical analyses, heat treatments, quenching media, movement in hardening and machinability as annealed.

23c—Nonferrous

23c-47. Copper and Copper-Base Alloys in Communications. *Copper & Brass Bulletin,* no. 145, Aug. 1948, p. 1-16.

Use of copper, brass and bronze in telephones, mobile phones, television, radio, telegraphy, and railway signal.

23d—Light Metals

23d-126. Magnesium in Germany During World War Two. Part V. (Concluded.) Hubert Altwicker and Ernest Josef deRidder. *Modern Metals,* v. 4, July 1948, p. 20-22.

Use by the Navy; miscellaneous uses; and conclusions.

23d-127. Sheet Aluminum for Automotive Uses. Frank W. Lynch and Jules F. Saut. *Modern Metals,* v. 4, July 1948, p. 28-31.

How aluminum is being used by the automotive industry, and some fabricating methods.

23d-128. Inert-Gas Welded Aluminum Pipe Line to Carry "Sour" Oil. *Petro-*

(Turn to page 54)

Sauveur Memorial Room Dedicated

(*Continued from page* 51)

Steel Treaters Society, predecessor of the American Society for Metals, and the first book to be published by the society, now one of the largest technical publishers in the world. Other documents, original manuscripts and historical items will be added from time to time in the future.

The room will be open at all times to members of the American Society for Metals and will serve a practical purpose by providing a dignified yet cheerful meeting place for A.S.M. national committees and other conference groups.

Following the presentation ceremonies tea was served to Mrs. Sauveur and her family, the national officers and past presidents of the society, former students of Professor Sauveur, and other friends of the society who joined in honoring the scientist's memory. Accompanying Mrs. Sauveur were her two daughters, Mrs. W. J. R. Taylor and Mrs. George C. Eaton, and a grandson and namesake, Albert Sauveur Eaton.

Much of the planning and preliminary arragements for the museum, as well as the collection of funds for purchase of the portrait and some of the furnishings, was done by a committee of former students of Professor Sauveur under the chairmanship of H. H. Lester of Watertown Arsenal. Other members of the committee were G. B. Waterhouse of Massachusetts Institute of Technology; V. N. Krivobok, International Nickel Co.; Joseph Winlock, Edward G. Budd Mfg. Co.; James P. Gill, Vanadium-Alloys Steel Co.: Bradley Stoughton, Lehigh University; and A. S. M. National Secretary W. H. Eisenman.

J & L Expands Facilities

A million-dollar expansion of laboratory and warehouse facilities for cold finished steel at the Pittsburgh Works of Jones & Laughlin Steel Corp. is nearing completion. The laboratory, built for close scientific quality control of cold finished steel production, will house a variety of modern testing apparatus and specialized equipment. The warehouse extension includes two new storage and loading bays to facilitate truck loading, and one new bay for loading of railway cars.

Erratum

Our apologies go to Earle C. Smith of Republic Steel Corp. for making him a little older than he actually is in the August issue of *Metals Review.*

Complimenting him on the award of the Lamme Medal, we stated that he was an 1888 graduate of Ohio State University, whereas he was in reality a member of the class of 1913. The late Benjamin G. Lamme should have rated the 1888 date!—Ed.

Gives $150,000 for Research

Crane Co., Chicago, has contributed $150,000 to the University of Chicago's basic research program. This sum covers both a five-year industrial membership in the university's Institute of Metals and a fellowship in its Institute for Nuclear Studies.

In announcing the contribution, John L. Holloway, president of the Crane Co., said: "The limitations imposed upon metals by temperature, stress and corrosion are the principal deterrents to greater progress in many industries. Basic metallurgical research is needed to expand our fundamental knowledge of the metallic state and thereby to develop new and improved metals."

FERROUS METALS TO THE FRONT!

Yes—the basic metals of industry get their big play in the October issue of Metals Review.

A year's progress of new developments in iron and steel manufacturing will feature the next issue. Something new in steel melting, castings, forgings or structural iron and steel for industry? Well—send it along!

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leum Engineer, v. 19, July 1948, p. 45-46.

23d-129. Aluminum Sheet on Large Roof. *Sheet Metal Worker,* v. 39, July 1948, p. 47.

One of the first large-scale applications of the new 0.004-in. embossed aluminum roofing sheet. Its installation.

23d-130. Hotel Faced With Plastic and Aluminum. *Engineering News-Record,* v. 141, July 22, 1948, p. 70-73.

23d-131. Les Arts Ménagers. (The Household Arts.) Francois Flusin, Jacques Piget, and Maurice Victor. *Revue de L'Aluminium,* v. 25, May 1948, p. 165-174.

Various applications of aluminum in the home.

23d-132. Un essai de destruction d'un moteur électrique utilisant des bobinages en fils d'aluminium isolés par oxydation électrolytique. (A Study of the Destruction of an Electric Motor With Coils and Wires Insulated by Electrolytic Oxidation.) *Revue de L'Aluminium,* v. 25, May 1948, p. 175.

Intentional burning of motor resulted in much less damage than would take place with conventional types.

23d-133. Taboo on Aluminium. *Discovery,* v. 9, June, 1948, p. 166-168.

Application of aluminum to food handling and storage, and possible limitations due to chemical attack or cleaning methods.

23d-134. Air Space-Aluminum Foil Are Ace Insulating "Team". Alexander Schwartz. *Roofing, Siding and Insulation,* v. 7, July 1948, p. 14, 16-17.

Advantages of the above.

23d-135. Structural Use of Aluminium. *Engineer,* v. 186, July 2, 1948, p. 9-10.

15-ton overhead crane and road bridge made of aluminum alloys.

23d-136. New Uses for Aluminum. George Perkins. *Stove Builder,* v. 13, Aug. 1948, p. 52, 54, 58, 60.

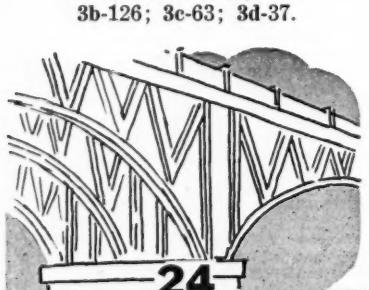
23d-137. Magnesium for the World's Largest Bomber. D. A. Tooley. *Modern Metals,* v. 4, Aug. 1948, p. 18-21.

Many of the specific applications. Why magnesium is the best material available for these uses.

23d-138. Some Important Things You Can Do With Wrought Aluminum Alloys. Owen Lee Mitchell. *Light Metal Age,* v. 6, Aug. 1948, p. 8-11.

Basic requirements in determining the feasibility of using aluminum from a fabrication and economic standpoint.

For additional annotations indexed in other sections, see: 3b-126; 3c-63; 3d-37.



24—DESIGN and STRESS ANALYSIS

24a—General

24a-185. Relaxation Methods Applied to Engineering Problems. XIII. The Flexure and Extension of Perforated Elastic Plates. R. V. Southwell. *Proceedings of the Royal Society,* ser. A, v. 193, May 27, 1948, p. 147-171.

A mathematical analysis.

24a-186. Internal Combustion Engine Valves. *Lubrication,* v. 34, July 1948, p. 73-84.

Construction, design, materials for and lubrication of these valves. Causes of failure are classed as breakage or burning. Other topics considered are valve and ignition timing, carburetion, deposits, and maintenance practices.

24a-187. Critical Shear Stress of Plates Above the Proportional Limit. George Gerard. *Journal of Applied Mechanics,* v. 15 (*Transactions of the American Society of Mechanical Engineers,* v. 70), March 1948, p. 7-12.

The secant-modulus method previously used for determining critical compressive stresses above the proportional limit was extended for use in determining the above. The method was confirmed by experiment. Nondimensional critical-shear-stress design curves for use with Al alloys.

24a-188. Strength and Failure Characteristics of Thin Circular Membranes. W. F. Brown, Jr., and George Sachs. *Transactions of the American Society of Mechanical Engineers,* v. 70, April 1948, p. 241-249; discussion, p. 249-251.

Commercially the problem investigated relates to the design of safety diaphragms used for the protection of pressure vessels, as well as to certain structures subjected to underwater explosion or high hydrostatic pressufe. The circular bulging of metal membranes also offers the possibility of investigating the fundamental properties of metal in biaxial stress and strain states. 19 ref.

24a-189. Production Processes—Their Influence on Design. Part XXXVI Roger W. Bolz. *Machine Design,* v. 20, Aug. 1948, p. 107-114, 184.

Hot extrusion of metals as applied to cable sheathings, hose casings, lead pipe, wire, and similar relatively simple cross-sectional forms and shapes of almost unlimited variety. (To be continued.)

24a-190. The Design of Dynamically Loaded Extension and Compression Springs. Curt I. Johnson. *Machinery,* v. 54, Aug. 1948, p. 159-164. (Continued.)

Tabular data and graphic representations designed to facilitate the solution of problems in compression and extension spring design.

24a-191. Details for Die Designers. Donald A. Baker. *Machinery,* v. 54, Aug. 1948, p. 175-178.

Reference sheet which shows a number of important die details that have been tried out and found to be effective in stepping up the efficiency of dies. Simple construction, easy adjustment, and maintenance of adjustment together with adaptability to standardization, are outstanding characteristics.

24a-192. Investment Castings. G. A. Stolze. *Machine Design,* v. 20, Aug. 1948, p. 139-142.

Requirements of design for proper casting.

24a-193. Uber den Einfluss der Beanspruchung auf die Bruchgefahr durch Spannungskorrosion. (The Effect of Stress on Fracture Because of Stress Corrosion.) Kurt Matthaes. *Metallforschung,* v. 2, July-Aug. 1947, p. 213-225.

Different materials that are sensitive to stress corrosion; the effect of mechanical and chemical stress; the effect of cracks, local, and alternating stress on fracturing. 13 ref.

24a-194. Fundamentals of Broaching. John A. Markstram. *Tool Engineer,* v. 11, Aug. 1948, p. 30-32.

Covers general conditions pertinent to proper design and subsequent use.

24b—Ferrous

24b-76. The Effect of Section Size on the Fracture Strength of Mild Steel. E. R. Parker. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40 B), 1948, p. 82-89.

Effect of section size on the fracture strength of following steel specimens: cylindrical specimens; unnotched flat plates; notched flat plates; geometrically similar specimens; and welded assemblies.

24b-77. Evaluation for Structural Design of Laboratory Data on Flow and Fracture of Steel. Wendell P. Roop. "Fracturing of Metals", American Society for Metals (also *Transactions of American Society for Metals,* v. 40 B), 1948, p. 133-146.

Problems introduced by the fact that members whose design for strength is more than adequate nevertheless are subject to failure. Indicates that the essential problem is one of obtaining a satisfactory test for ductility and then finding how much of it is needed by a given structure in a given service. General features of three types of test which should be developed.

24b-78. Spring Design and Manufacture. Parts I and II. John A. Roberts. *Wire and Wire Products,* v. 23, June 1948, p. 479-483; July 1948, p. 583, 586-588, 624-626.

Previously abstracted from *Wire Industry,* v. 15, Jan. 1948, p. 43-44, 47; Feb. 1948, p. 109-112. See item 24b-12, 1948.

24b-79. The Mechanics of Locked-Coil Wire Ropes. J. A. L. Matheson. *Engineering,* v. 165, June 18, 1948, p. 578-581. June 25, 1948, p. 601-604.

Manufacture of these ropes, and a dead-weight tester developed for their investigation. In most previous tests, both ends were secured; however, in the tests described, one end was free to rotate. Test results, both for extension and for untwisting.

24b-80. Progressive Die Design. Part VII. C. W. Hinman. *Modern Machine Shop,* v. 21, Aug. 1948, p. 170-172, 174, 176.

An intricate progressive die which is designed to form flat steel blanks into cylinders.

24b-81. How to Choose the Proper Wire-Rope Construction. W. I. Lex. *Power,* v. 92, Aug. 1948, p. 79-81.

Designs for flexibility and strength, and for high resistance to abrasion, corrosion, and bending fatigue. Applications for each type that gives satisfactory service. Nonpreformed and preformed rope are compared.

24b-82. Research Work on Rail Sections. Walter Leaf. *Transactions of the American Society of Mechanical Engineers,* v. 70, Jan. 1948, p. 31-35.

As a result of a failure in 112-lb. rail on mainline track of the D. & R.G.W., studies of fatigue failure of rails were undertaken. Faulty rail design was found to be the cause of failure. From this work and that of the A.R.E.A., new rail designs have been evolved.

24b-83. The 103,000-Hp. Turbines at Shasta Dam. J. F. Roberts. *Transactions of the American Society of Mechanical Engineers,* v. 70, April 1948, p. 217-224; discussion, p. 225-226.

Details of design and mechanical properties of welded and riveted joints used in different locations. Fabrication and testing procedures.

(Turn to page 56)

MANUFACTURERS' LITERATURE

Use the Handy Coupon to Obtain This Helpful, Free Literature

105. Finishing

A new manual illustrating and describing roto-finishing in detail with an outline of the four principal procedures—deburring and grinding, polishing, britehoning and coloring. Sturgis Products Co.

106. Forgings

Numbers 1 and 2, Volume 10 of "Forgings" features the farm and petroleum field. Many illustrations and interesting material on forgings for these industries are shown in an attractive manner. Kropp Forge Co.

107. Furnaces, Heat Treating

8-page booklet illustrates gas, oil and electric heat treating and carburizing furnaces. Holcroft and Co.

108. Lab Furnaces

Two new Leco box type furnaces are fully described in a 4-page leaflet; one designed for use in temperatures up to 2900° F. the other for temperatures up to 2600° F. Laboratory Equipment Corp.

109. Magnetic Material

"Hardyne", an easily fabricated permanent magnet material that may be pressed to form complex shapes requiring no sintering discussed in July 15 issue Metal Powder News. Charles Hardy, Inc.

110. Metal Sawing

16-page booklet unique engineering experience embodied in line of four basic circular sawing machines for cutting stock from ¼" to 16½", all utilizing the advantages of the triple-chip saw blade in diameters from 8" to 45", with correct automatic sharpeners to grind all blade sizes. Motch & Merryweather Machinery Co.

111. Nickel

Nickel silver and nickel brass rods, extruded shapes, forgings and die castings are illustrated in 4-page folder. Analyses, physical properties and corrosion tests included. Titan Metal Mfg. Co.

112. Nickel Plating

"Practical Nickel Plating" is a new booklet on the subject of industrial nickel plating. It discusses solution compositions and operating conditions, and suggests cycles for treatment of the base metals prior to plating. International Nickel Co.

113. Permanent Magnets

An eight page illustrated bulletin CDM-12 describing GE metallurgical products, including cast and sintered Alnico, Cunife, Cunico, Vectolite, Silmanal, and various permanent magnet holding assemblies. General Electric Co.

114. Plating Rack Coating

4-page leaflet describes "Enthonite 101" a new liquid plastic plating rack coating. Material also has extensive use for coating metals to resist severely corrosive organic materials. Enthone, Inc.

115. Rust Inhibitor

Water-emulsion used as a rust-inhibiting coating for metals and applied by dipping, spraying, wiping or flow coating is described in new literature. S. C. Johnson & Son, Inc.

116. Screw Thread Inserts

Bulletin 248 contains 12 pages of latest design data, tables, applications, and illustrations of Heli-Coil screw thread inserts. Heli-Coil Corp.

117. Selenium Rectifiers

8-page catalog describes and illustrates with engineering data a complete line of selenium rectifiers for electro-plating and other industrial uses. Richardson-Allen Corp.

118. Stainless Piping

Bulletin 483, a new 4-page booklet, includes drawings, dimensions and prices of new type fittings and flanges, available in Stainless 304, 347, 316 and other materials. Taylor Forge & Pipe Works.

119. Stainless Steel

8-page bulletin describes a high alloy low carbon austenitic stainless steel known as Durimet 20, for use with about 125 corrosive solutions. Duriron Co., Inc.

120. Tempils

New "Stainless Steel Data Sheet" published in latest Tempil Topic, copies of which will be supplied on request. Tempil Corp.

121. Tube Testing

Testing machine for hydrostatically testing steel tubes or pipes in sizes from 1" to 4" O.D.; lengths from 10' to 26' and at test pressures ranging from 750 psi to 3000 psi described in bulletin. R. D. Wood Co.

122. Welding Electrodes

New electrode booklet DH 45, "Page Hard Surfacing Electrodes," which contains a description of five new electrodes developed to provide a weld metal deposit whose particular properties are suited to definite welding applications. Page Steel & Wire Div.

123. Welding

All metal joining headaches eliminated in a new 8-page illustrated bulletin containing more than 60 illustrations of how new low temperature welding alloys can save defective equipment and machinery. Also featured is the new cutting electrode, Cuttrode, for cutting metals without the use of special equipment or oxygen. Eutectic Welding Alloys Corp.

124. Zinc Alloy

Eraydo Alloy a new high grade zinc alloy is described in a 4-page leaflet, outlining its many advantages and uses in sheet or roll form for home appliances, roofing and a wide variety of products and parts. Illinois Zinc Co.

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24c—Nonferrous

24c-10. Designing for Silver Brazing by Induction Heating. Frank W. Curtis. *Product Engineering,* v. 19, Aug. 1948, p. 109-113.

Design relationships, placement of parts, clearance between surfaces, relative position of silver alloy and heating coils.

24d—Light Metals

24d-25. Design of Aluminum Truck Bodies. *Modern Metals,* v. 4, July 1948, p. 15-19.

Design and fabrication.

24d-26. Stress Notch Sensitivity With Eccentric Holes. L. Schapiro and R. H. Esling. *Transactions of the American Society of Mechanical Engineers,* v. 70, Feb. 1948, p. 135-138.

The tension strengths of some cross sections containing holes of several diameters in various positions of eccentricity were determined for aluminum alloys 24 S-T, 75 S-T, and 14 S-T. A mathematical expression is suggested for the relationship between strength, hole size, and eccentricity of hole. The relative stress notch-sensitivity of the three alloys was found to be the same with eccentric holes as for central holes or external notches.

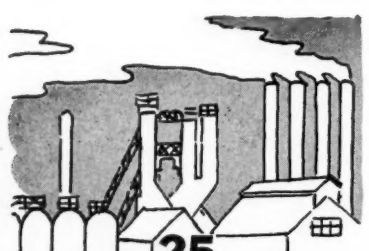
24d-27. Fracture Strength of 75 S-T Aluminum Alloy Under Combined Stress. E. G. Thomsen, I. Lotze, and J. E. Dorn. *National Advisory Committee for Aeronautics, Technical Note* No. 1551, July 1948, 30 pages.

The effect of combined and other stresses on the fracture strength of 75 S-T aluminum alloy is determined by applying axial loads and internal pressure to thin-wall drawn tubes. Tubular extrusions of 75 S-T aluminum alloy rupture in substantial agreement with the critical shear-stress law for fracture. 13 ref.

24d-28. Flexural Strength and Stiffness of Wood-Aluminum Sandwich Panels. Roy A. Miller and Henry L. Langhaar. *Product Engineering,* v. 19, Aug. 1948, p. 104-108.

Investigation and appraisal of the structural properties and efficiency of sandwich panels and columns having aluminum skins and cores of different woods.

For additional annotations indexed in other sections, see:
9a-55; 16a-74; 22a-170; 27a-111.



25 STATISTICS

25a—General

25a-45. Seventy-Five Years of Progress in Mineral Production—The Statistical Record. Elmer W. Pehrson. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946.* (American Institute of Mining and Metallurgical Engineers), 1947, p. 358-375.

25a-46. The Mineral Position of the United States. J. A. Krug. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 551-558.

25a-47. Tariffs, Cartels, and the Mineral Industry. Willard L. Thorp. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 615-622.

25a-48. South American Minerals in the Future World Economy. Pedro Beltran. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 623-633.

25a-49. Position of United States With Respect to Some of Lesser Known Mineral Raw Materials. Richard J. Lund. *Metals,* v. 19, July 1948, p. 7, 9-10.

Believes that a measure of federal control over usage or distribution may be advisable to accelerate the government stockpiling program.

25a-50. Mineral Industry Surveys. *Bureau of Mines,* 1948.

Mimeographed compilations of current U. S. statistics covering a specific metallic or nonmetallic mineral, for instance, "Iron Ore in January 1948". They are issued at irregular intervals. Some are very short (2 to 3 pages), and are issued weekly or monthly; others are quite extensive and cover a full year.

25b—Ferrous

25b-73. Iron Ore and the Steel Industry. C. M. White. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 559-586.

Iron-ore reserves.

25b-74. Elimination of Steel Basing Point System Would Have Varying Effect on Consuming Industries. Harold A. Knight. *Materials & Methods,* v. 28, July 1948, p. 51-54.

25b-75. A Primer on Steel Conversion. D. I. Brown. *Iron Age,* v. 162, July 29, 1948, p. 72-77.

The how and where of conversion arrangements and some of the complex technical problems involved. Only the practical details of conversion from ingots or slabs to sheet or strip are presented.

25b-76. The British Iron and Steel Industry. *Metallurgia,* v. 38, July 1948, p. 137-143.

Interprets conditions during the inter-war period, the effect of reorganization schemes put into operation during a period of depression, and the developments made since 1945.

25b-77. Economics of Ferrous Smelting in Canada. P. E. Cavanagh. *Canadian Mining and Metallurgical Bulletin,* v. 41, July 1948, p. 398-408.

A comprehensive study of the economics of processes for smelting iron ores. Investigations of all processes in commercial use, and proposed processes which are still in the experimental stage.

25c—Nonferrous

25c-57. Copper, Lead and Zinc Mining in the Future. Clinton H. Crane. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 596-602.

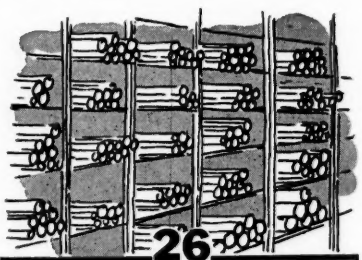
Economic considerations.

25c-58. The Future of Gold in World Economy. P. M. Anderson. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 603-614.

25c-59. Problems Facing Joplin Ore Producers. O. S. Bilharz. *Metals,* v. 19, July 1948, p. 11-12.

25c-60. Tungsten Deposits in Alaska. Robert L. Thorne, Neal M. Muir, Aner W. Erickson, Bruce I. Thomas, Harold E. Heide, and Wilford S. Wright. *Bureau of Mines, Report of Investigations* No. 4174, June 1948. 51 pages.

Availability of tungsten and results of beneficiation and sampling tests.



26 MISCELLANEOUS

26a—General

26a-64. Metals and Alloys of the Future. Zay Jeffries. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 745-758.

Economic and technological factors.

26a-65. Fulmer Institute, a Counterpart of Mellon. *Chemical and Engineering News,* v. 26, July 19, 1948, p. 2120-2121.

New British "sponsored research" institute, which is specializing in metallurgy to begin with.

26a-66. Protecting the Life of Anti-Friction Bearings. H. O. Smith. *Modern Machine Shop,* v. 21, Aug. 1948, p. 124-130, 132, 134, 136, 138, 140.

Maintenance and lubrication procedures.

26a-67. Studies in Boundary Lubrication. II. Influence of Adsorbed Moisture Films on Coefficient of Static Friction Between Lubricated Surfaces. W. E. Campbell and E. A. Thurber. *Transactions of the American Society of Mechanical Engineers,* v. 70, May 1948, p. 401-406; discussion 406-408.

Extraordinarily high values of this coefficient between steel surfaces lubricated with straight-chain normal hydrocarbons (heptane to decane) are shown to be due to a film of adsorbed moisture at the solid-liquid interface. Friction measurements are recorded for four fundamentally different lubricant types on steel, brass, and glass in equilibrium with dry air and air of 75% humidity. Friction was raised from 40 to 70% in the high humidity. 16 ref.

26a-68. Studies in Boundary Lubrication. III. The Wear of Carbon Brushes in Dry Atmospheres. W. E. Campbell and Rose Kozak. *Transactions of the American Society of Mechanical Engineers,* v. 70, July 1948, p. 491-496; discussion, 496-498.

The dusting rate of carbon brushes in dry nitrogen against several metals is shown to decrease as the hardness of the metal increases. It was found to be zero on smooth chromium and rhodium surfaces. Results are consistent with recent theories of solid friction.

(Turn to page 58)

Compliments

To ROBERT F. MEHL, director of the Metals Research Laboratory of Carnegie Institute of Technology, on his appointment as chairman of the Committee on Ship Steel of the National Research Council. This committee will advise government agencies on a research program directed at determining the metallurgical causes of brittle fracture in steel that led to the failure of a number of ships during World War II.

♦ ♦ ♦

To PAUL SCHWARZKOPF of American Electro Metal Corp. on receipt of the honorary degree of Doctor of Technical Sciences conferred by the Technische Hochschule of Graz, Austria, at the recent International Powder Metallurgy Conference held in that city.

♦ ♦ ♦

To CLYDE E. WILLIAMS, director of Battelle Memorial Institute, on the award of the Medal For Merit, presented by Col. William O. Eareckson of the Air Force. The medal was awarded to Dr. Williams for his outstanding services to the United States in the years 1940 to 1946, when he served as head of the joint Advisory Committee on Metals and Minerals of the National Academy of Sciences and the National Research Council, and its successor agency, the War Metallurgy Committee.

M. M. Clark Dies in Canton Was Climax Representative

Morrell M. Clark, 55, district sales manager at Canton, Ohio, for Climax Molybdenum Co., died Aug. 8 after suffering a heart attack.

Mr. Clark, who had been identified with the steel industry since he was a young man, first came to Canton in 1915 as superintendent of the cold drawn bar department of the United Alloy Corp. On that company's merger with Central Alloy Steel Corp., Mr. Clark went to Massillon in the metallurgical department. In 1932 he joined the Mitchell Steel Co. of Cincinnati in a metallurgical capacity.

From 1936 to 1944, he was with Carnegie-Illinois Steel Corp. in Chicago, where he headed the carbon hot rolled and cold finished bar division. Four years ago he returned to Canton as representative for Climax.

Mr. Clark was a member of the executive committee of the Canton-Massillon Chapter A. S. M.

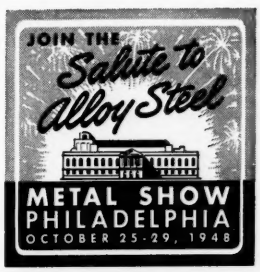
New Members of A. S. M. Quarter-Century Club

The following A. S. M. members have been awarded honorary certificates commemorating 25 years' consecutive membership in the society:

Columbus Chapter — Oscar E. Harder.

Lehigh Valley Chapter—Samuel T. Harleman.

New Jersey Chapter—George H. Bierman, B. Clements, Norman L. Dueble, H. M. German, A. A. Hassan, Jr., James H. Heath, Willard L. Hults, George S. Longley, Jr., Harry D. McKinney, Warren A. Quadenfield, J. B. Shelby, Richard W. Thorne, Driver-Harris Co. (Sustaining Member).



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26a-69. Automobile Engineering Research. *Engineering*, v. 166, July 2, 1948, p. 18-19; **Motor Industry Research Association.** *Engineer*, v. 186, July 2, 1948, p. 8-9.

Some of the equipment and research work in progress in the laboratory of the Motor Industry Research Assoc. in Britain. Equipment includes: a gear-tooth fatigue-testing machine, a bearing-test machine, and a test apparatus for torsional fatigue of crankshafts.

26a-70. Process Research. A. H. Aston. *Engineer*, v. 186, July 2, 1948, p. 2-3; July 9, 1948, p. 28-29.

Technique of factorial design for planning research, in which all of the variables involved are varied at once, and the effects of altering each factor singly or in combination with others are determined by simple group comparisons. Great economy in experimental work over usual methods is claimed.

26a-71. Water-Mixtures as Grinding and Cutting Fluids. William H. Oldacre. *Lubrication Engineering*, v. 4, Aug. 1948, p. 162-165, 186.

Application in metal cutting, and current machine practice as it is affected by water mixtures.

26a-72. Verschleissabwehr. (Protection Against Wear.) Hans Wahl. *Metalloberfläche*, v. 1, June 1947, p. 145-151.

Undesirable effects of wear; defines wear and describes its many different forms; basic principles, and methods of reducing the wear of different metallic and nonmetallic substances. Classification of types of wear and wear protection of a number of substances applied to different functions.

26a-73. Beeinflussung der Ritzhärte durch adsorbierte Flussigkeitsschichten. (Effect of Adsorbed Liquids on the Hardness to Scratching.) Gerhard Bachmann and Liselotte Fiddecke. *Metallforschung*, v. 2, July-Aug. 1947, p. 239-243.

Method of testing the effect of lubricants on the surface hardness of metals at constant and variable loads; the effect of dispersion, cold working, and recrystalization on the "scratch hardness" of lubricated metals.

26b—Ferorus

26b-26. Steel Industry Electrification Trends. L. A. Umansky. *Electrical Engineering*, v. 67, Aug. 1948, p. 774-775.

A general discussion. 16 ref.

26b-27. The Technical Trends in Steel Research. E. C. Bain. *Steel Processing*, v. 34, Aug. 1948, p. 432-433, 439-441.

Condensed from a lecture reviewing progress in research. (To be continued.)

26c—Nonferrous

26c-14. Seventy-Five Years of Progress in Nonferrous Metallurgy. W. M. Peirce. *Seventy-Five Years of Progress in the Mineral Industry, 1871-1946* (American Institute of Mining and Metallurgical Engineers), 1947, p. 199-222.

26c-15. Porous Bushings. H. A. Unckel. *Metal Industry*, v. 73, July 23, 1948, p. 67-70.

Results of an investigation undertaken to obtain data on the frictional characteristics of porous bronze and iron bushings in the usual speed and loading ranges. Comparisons between bushings made from porous bronze, sintered iron and solid tin-bronze rod.

For additional annotations indexed in other sections, see:
1a-24.

27a—General

27a-108. Fracturing of Metals. 311 pages. 1948. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $5.00. (Also *Transactions of American Society for Metals*, v. 40B.)

An introduction by George Sachs, a summary by Wendell P. Roop, and 17 papers, including stress testing, plastic flow and failure, notch testing, and effects of various factors. Individual papers are being abstracted separately.

27a-109. A Brief History of the Science of Metals. Robert Franklin Mehl. 83 pages. 1948. American Institute of Mining and Metallurgical Engineers, Inc., New York, N. Y.

Deals with development of physical metallurgy from a preliminary period, before 1871; 1871 to 1900, 1900 to the present. Includes 364 references.

27a-110. Engineering Machine Shop Practice. Ed. 2. B. Richard Hilton. 189 pages. Sir Isaac Pitman & Sons, Ltd., Parker St., Kingsway, W.C.2, London. 6s.

Written primarily for apprentices in production engineering and others requiring a knowledge of the practical principles of the machine shop. After a chapter on materials of construction, measuring instruments and marking out are dealt with, also manual operations such as filing, scraping, polishing and screwing, and heat treatment. The rest of the book is devoted to the various basic types of machine tools. (From review in *Machinery* (London), v. 73, July 8, 1948.)

27a-111. Resistance et Encombrement Des Engrenages. (Gear Design). 2 vols. J. Bergere. 216 pages. Dunod, 92 Rue Bonaparte, Paris 6, France. 1250 fr.

The space to be occupied by the gearing is correlated with other essential requirements relating to strength, deflection, speed, and fatigue. The action of gearing is analyzed and the various forces involved are thoroughly investigated. A number of fully worked-out examples are included. Vol. 1 contains the text and vol. 2 the diagrams. (From review in *Machinery* (London), v. 73, July 8, 1948.)

27a-112. Designing for Mass Production. Ed. 2. J. R. Fawcett. 142 pages. Sir Isaac Pitman & Sons, Ltd., Parker St., Kingsway, W.C.2, London. 15s.

Assumes that the reader is familiar with ordinary workshop processes and has a knowledge of machine drawing. There are seven chapters dealing with: properties of materials; cast irons and steels; nonferrous metals and plastics; manufacturing processes; interchangeable manufacture; standardization and specialization; and drawings and specifications. All the usual types of machine tools are discussed briefly, also their tooling and the kind of work-pieces for which they are suitable. General information on press-work, welding, and finishing processes. (From review in *Machinery* (London), v. 73, July 8, 1948.)

27a-113. Precision Grinding With the Modern Abrasive Wheel. Ed. 2. 54 pages. A. A. Jones & Shipman, Ltd., Narborough Road South, Leicester, England. 12s, 6d.

Essential, basic, information on correct operation of grinding machines in a form convenient for ready reference, and thumb-indexed into sections and subsections. A useful section is that dealing with defective work, its causes, and correction. Grinding wheel balancing, truing, and dressing are fully treated; also methods of producing a fine surface finish. Coolants and coolant supply are also considered. (From review in *Machinery* (London), v. 73, July 1, 1948.)

27a-114. Plasticity in Engineering. F. K. Th. van Iterson. 184 pages. 1947. Blackie and Son, Ltd., London, England.

Largely restricted to discussion of problems related to materials showing no work hardening, but also deals with mild steel undergoing moderate deformation. A treatment of the brittle-rupture problem is included. The treatment is highly fundamental in character and introduces some radical departures from present concepts. An able presentation of a difficult and controversial subject. (From review in *Journal of Applied Mechanics*. v. 15, (*Transactions of the American Society of Mechanical Engineers*, v. 70), March 1948.)

27a-115. The Mineral Key. Ed. 1. Howard B. Graves. 178 pages. 1947. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y.

Tables list 823 minerals, their chemical formulas, composition, and distinguishing characteristics. Use of the tables is explained, and tests are described which involve only use of inexpensive chemicals and simple apparatus.

27a-116. Machine Tool Research and Development. D. F. Galloway. 79 pages. 1945. Research Department, Institution of Production Engineers, London, England.

Spindles and spindle bearings, including notes on vibration, speed range, influence of bearing clearance of plain bearings, and the problems arising in the use of ball and roller bearings; drives, tool holders, and machine bodies. Attention is also drawn to the position of controls and ease of operation, as well as to various problems of machine testing and standardization.

27a-117. Bibliographic Survey of Corrosion; 1945. Robert D. Misch, James T. Waber, and Hugh J. McDonald. 129 pages. 1948. National Association of Corrosion Engineers, 905 Southern Standard Bldg., Houston, Tex.

A compilation of abstracts on general material and patents.

27a-118. Molybdenum: Steels, Irons, Alloys. R. S. Archer. 391 pages. Climax Molybdenum Co., 500 Fifth Ave., New York, N. Y.

The varied applications of molybdenum as an alloying element. Covers a wide range of materials from wrought to cast steels and from cast iron to nonferrous alloys. An attempt has been made to show the fields of similarity and dissimilarity of the various materials and to indicate some of the factors that

(Turn to page 60)

Represents the Lanly Co.

The Stanley P. Rockwell Co. of Hartford, Conn., has been appointed exclusive factory representative in New England for the Lanly Co. of Cleveland. The Rockwall organization is now in a position to recommend and quote on ovens for all industrial purposes. The line will be handled by Howard F. Barton and Dudley W. Rockwell.

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The Employment Service Bureau is operated as a service to members of the American Society for Metals and no charge is made for advertising insertions. The "Positions Wanted" column, however, is restricted to members in good standing of the A. S. M. Ads are limited to 50 words and only one insertion of any one ad. Address answers care of A.S.M., 7301 Euclid Ave., Cleveland 3, Ohio, unless otherwise stated.

POSITIONS OPEN

East

TECHNICAL PERSONNEL: For New York City area and Silver Spring, Md. Applicants must have at least three years' experience in piping, structural or heating and ventilating. Director of chemical research and development; chemist—Ph.D. or equivalent; job engineer—electronic; chemist and associate chemist; physicist and associate physicist; director of physical research and development; librarian; mechanical engineer; metallurgist. The Kellex Corp., 233 Broadway, New York 7, N. Y.

RESEARCH ENGINEER: Opening at eastern university for man capable of taking charge of a research program concerned with the fracture and ductility properties of steel. Opportunity to work for advanced metallurgical or civil engineering degree. Metallurgical training desirable. Salary up to $3600 depending on experience. Applicants for this position should submit complete scholastic and experience record together with a recent photograph. Box 9-5.

RESEARCH ASSISTANTSHIP: In powder metallurgy at eastern university. One-half time to be devoted to research in the field of powder metallurgy, remainder on graduate work leading to M.S. or Ph. D. $100 per month. Start September 1948. Please accompany inquiry with reference letters and academic record. Box 9-10.

METALLURGIST OR PHYSICIST: Good background in metallographic analysis and physical metallurgy. For research in metallurgical applications of the electron microscope. Familiarity with electron microscopy is desirable but not necessary. Supervisor of Employment, Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.

WELDING RESEARCH ENGINEER: To carry on a major assignment in resistance welding. Engineering graduate with three to five years' experience. Should know electrical and electronic controls for wedling machines, and acquaintance with ferrous metallurgy would be desirable. Box 9-15.

RECENT METALLURGICAL GRADUATE: Interested in research and development work on a large variety of tool, stainless and low-alloy constructional steels. State age, marital status, education, experience and salary expected. Box 9-130.

Southeast

ASSISTANT PROFESSOR: To teach metallography, heat treatment and welding. Box 9-20.

Midwest

METALLURGIST: Graduate (or equivalent), draft exempt, with experience in metallography and heat treatment for position as assistant in small western Michigan firm. Production quality control and development work for alloy steel products. Salary commensurate with qualifications and experience. Please send complete information with your reply. Box 9-25.

ASSOCIATE DIRECTOR OF RESEARCH: Exceptional opportunity for graduate research metallurgist with at least ten years' research experience. Competent to do consulting, or head physical metallurgy, welding and corrosion research. Should have ability to carry out fundamental research program. Standard Oil Co. (Indiana), 910 South Michigan Ave., Chicago 80, Ill.

West Coast

INDUSTRIAL SALES ENGINEERS: For distribution of all kinds of nonferrous metals and accessories by warehouse and mill services. Must be familiar with soldering, welding and brazing these materials. University metallurgical training preferred. Box 9-30.

RESEARCH METALLURGIST: For research on materials and fabrication of chemical process equipment. Prefer Ph.D. in physical metallurgy with several years' experience. Box 9-35.

POSITIONS WANTED

METALLURGICAL ENGINEER: B.S. in 1939. Age 31, married. Nine years' experience—five years in supervisory capacity. Thoroughly familiar with all phases of the manufacturing processes, physical properties and uses of copper and copper base alloys. Desires position with progressive nonferrous manufacturer or fabricator. Midwest or West preferred. Box 9-40.

METALLURGICAL ENGINEER: Age 27, married. Desires position in sales or in metallurgical development of procedures and methods. Experience includes five years in first-class research laboratories with considerable work in the development of stainless steel products. Aptitude for organizing development programs and writing technical reports. Prefers Philadelphia area. Box 9-45.

MATERIALS AND METHODS ENGINEER: B.S. and M.Sc. in metallurgical engineering. Supervisory production and research experience in smelting, alloy development, and process methods. Will consider teaching, production or research. Midwest preferred. Box 9-50.

METALLURGIST—FERROUS: Eight years' heat treat, metallurgical laboratory experience. Extensive investigations of finished parts failures. Familiar with carbon, alloy, high speed and stainless steels. Competent metallographer. Administrative experience. Desires position as metallurgist or assistant in production or research laboratory in South or West. Box 9-55.

RESEARCH AND DEVELOPMENT METALLURGIST: With experience in handling people and directing research. Good background in specialty steel mill. Would like similar position elsewhere. University graduate in metallurgy 1929, and doctor of science degree in 1934. Experience and patents on improvements on all types of steels. Also experienced in physical testing, pyrometry and metallography. Any location. Box 9-60.

METALLURGIST: With doctor of science degree and seven years' experience as college professor in metallurgy, employed since the beginning of the war in industrial steel mill research and development, desires to return to teaching with opportunity for research or consulting work on the side. Box 9-65.

METALLURGIST OR WELDING ENGINEER: Experience in all types of ferrous metallurgical work in supervisory capacity—heat treating, testing, microscopy, trouble shooting, development and control. Box 9-70.

METALLURGICAL ENGINEER: Married. All major courses completed for M.S. degree in metallurgy at Stevens Institute of Technology 1948. Thesis in powder metallurgy. Eight years' experience in research laboratory. Desires position in the metallurgical field. Box 9-110.

MANUFACTURERS' REPRESENTATIVE: Covering Minnesota, northern Iowa, and western Wisconsin wants additional exclusive line on commission basis. Box 9-75.

METALLURGIST: Carnegie Institute of Technology graduate, P.E. Broad industrial experience directing process and materials development, applications, research, inspection, quality control. Background in alloy steel mills, manufacturing, aircraft; U. S. and abroad. Technical writer of established reputation. Seeks position as executive department head, technical representative, or advisor to management. Will locate anywhere. Box 9-80.

JUNIOR METALLURGIST: Single, 28 years old. Seven years' experience, ferrous and nonferrous. Laboratory and shop contact work covering electric and gas welding, heat treating, physical testing, metallography, failure investigation, report and specification writing. Interested in sales or production metallurgy. Box 9-85.

MATERIALS AND MANUFACTURING ENGINEER: Metallurgist with 22 years' experience in steel manufacturing and fabrication, production tooling, heat treating, resistance and arc welding, brazing, controlled atmosphere and salt bath furnace operation, drop forging and cold heading. Box 9-90.

METALLURGICAL ENGINEER: Recent graduate of R.P.I., member of Sigma Xi. Married veteran with child, age 25. Present position does not offer sufficient responsibility to warrant whole-hearted interest. Eight months' experience in malleable industry. Desires development, or experimental engineering work. Primarily interested in automotive industry. Willing to travel. Box 9-95.

METALLURGICAL ENGINEER: B.S. in metallurgical engineering. Two and one-half years' works and research laboratory experience with outstanding manufacturing firm, in physical metallurgy, metallography, stainless steels, and conducting trouble shooting investigations. Interested in heat treating, welding, foundry or precision casting, applications or development. 1943 graduate. Age 27. Prefers New York City area. Box 9-100.

METALLURGICAL ENGINEER: Age 36; Twelve years' experience in manufacture of ferrous and nonferrous screw machine products, stampings, forgings, automotive and aircraft accessories. Thoroughly familiar with metallurgical problems involving selection of material, heat treating equipment, process and product control and development, chemical and physical testing. Currently employed as chief metallurgist. Desires to relocate. Box 9-105.

STAINLESS STEEL METALLURGIST: Age 37; 10 years' experience with manufacture and fabrication of stainless bar, wire and sheet material; 2 years with plain carbon and alloy steels; and 3 years with brass and bronze alloys. Qualified for position as chief metallurgist. Box 9-115.

METALLURGIST OR SALES: Age 26; B.S. in Met. Eng. 11 years' diversified experience in heat treatment, metallography, automechanics, ferrous research projects, and an extensive liaison relationship between production and research for a major automotive manufacturer. Recently sales engineer and assistant sales manager. Detroit vicinity preferred. Box 9-120.

SUPERINTENDENT: Six years' experience in commercial heat treating and 2 years as superintendent of small manufacturing company. Desires permanent position. Age 31, one child. Box 9-125.

may affect the choice of the most economical material for a specific part. Considerable recent information is included, not only on the more prominent developments, but also on the work that has served to clarify the factors affecting the service life of the lower alloy steels.

27c—Nonferrous

27c-16. The Economics of Mining. Ed. 3. Theodore Jesse Hoover. 551 pages. 1948. Stanford University Press, Stanford, Calif.

A survey covering latest economic developments in the mining world and many phases of mining economics with particular attention to valuation, organization, and management of nonferrous metal mines.

27d—Light Metals

27d-13. Analytical Methods for Aluminum Alloys. Carl H. Burton. 103 pages. 1948. Aluminum Research Institute, Chicago, Ill.

A compilation of methods as a guide to laboratories for sampling and analysis, including chemical, photometric, and spectrographic methods.

October M. P. Features Convention Theme

In conformity with "The Salute to Alloy Steel," the theme of A.S.M.'s 30th annual convention, the October preconvention issue of *Metal Progress* will feature a series of articles showing how the low-alloy, engineering steels and irons have influenced the development of our principal industries, and through that fact have promoted our national economy, well-being and safety.

Articles of this sort will be presented about the impact of alloy steels on the automotive industry, the railroads, the aircraft, the electrical industry, the petroleum industry, farm equipment, machine tools and ordnance. Authors will be such competent men as Clyde Williams, J. L. Carver, Arthur W. F. Green, J. T. Rettaliata, Wm. F. Sherman.

Carl A. Zapffe is also preparing a brief history of the metallurgical development of alloy steels in America, which will be published in that issue.

As a further innovation, abstracts of all the papers to be presented to the A.S.M. technical sessions at the Philadelphia convention will be printed in *Metal Progress*. Half of them have already appeared in the September issue. They are arranged meeting by meeting, and should give a much better idea of what will be discussed than a mere list of titles.

New Company Organized

Announcement of the organization of a new manufacturer of powdered metal products, the International Powder Metallurgy Co., Ridgway, Pa., was made recently by firm officials. M. T. Victor, formerly sales and field engineer for Keystone Carbon Co., is president, and G. J. Hoehn is vice-president.

Control of Dew Point Gives Control Over Carburizing Potential

Reported by Nelson Meagley
Willys-Overland Motor Co., Inc.

H. M. Heyn

Recent studies of carburizing by cracked gas-air mixtures have shown that the controlling factors in the carburizing operation are the CO_2 content and the dew point of the gas mixture. Since the dew point is more readily measured, this factor has been selected as the single value for controlling the carburizing action of the widely used 20% CO, 40% H_2, 40% N_2 prepared gas atmospheres.

The developments leading to the application of this principle to practical heat treating were presented at a recent meeting of the Toledo Group A.S.M. by Henry M. Heyn, manager of the heat treat division, Surface Combustion Corp. Gladwell Davison of the National Supply Co., and newly elected chairman of the group, acted as general chairman of the meeting. O. E. Cullen, chief metallurgist of Surface Combustion Corp., served as technical chairman.

A self-contained unit, the so-called RX Generator, is used to produce the 20% CO, 40% H_2, 40% N_2 gas mixture which may be used for clean hardening or carburizing steel in radiant tube or alloy muffle furnaces. The action of this atmosphere on steel is determined by its carburizing potential. If clean hardening is desired—without change in the surface carbon content of the work—the carburizing potential of the atmosphere is adjusted to the carbon content of the steel being treated. If the steel is to be carburized, the carburizing potential of the gas is adjusted to produce a steel surface carbon of desired concentration. This is accomplished by setting the RX gas generator to produce a furnace atmosphere having a correct dew point. Thus, control of the carburizing potential becomes a matter of control over the dew point. To meet this need, an automatic, instantaneously reacting dew point recorder was developed by the research laboratory of the speaker's company.

The 20-40-40 gas mixture described above is effective in developing surface carbon contents up to about 1.0%. Methane is used to raise the potency of the gas atmosphere above this level. Until the role of the dew point in gas carburizing was understood, it was considered necessary to use high (up to 33%) concentrations of methane in the carburizing atmosphere. However, methane contents greater than 10% tend to have objectionable sooting characteristics.

By application of dew point control, small percentages of methane (2 to 4%) can be used to increase the carburizing potential of the RX gas to values over 3% carbon, if desired, under practical conditions of furnace time and temperature. When the methane content is maintained at such low levels, the soot deposition is not objectionable. Further research is conducted to develop efficient carburizing processes with atmospheres containing less than 1% methane or equivalent hydrocarbon gases.

Veteran of 30 Years in Toolsteel Sales Dies

A. F. Dohn, 73, director and honorary vice-president of Allegheny Ludlum Steel Corp., died July 29 after suffering a heart attack. Mr. Dohn retired as vice-president in charge of toolsteel sales for Allegheny Ludlum in 1941, after more than 30 years as one of the nation's outstanding steel salesman.

Mr. Dohn's early affiliations included the Crosby Co. of Buffalo and the Buffalo Engine Co. He began his long career in the toolsteel business in 1912 when he established his own sales office in Buffalo as a distributor of toolsteels manufactured by Atlas Crucible Steel Co. Three years later he joined Atlas as a special sales representative and became vice-president in charge of sales in 1916. He was elevated to the presidency of Atlas in 1924.

In 1929, when Atlas was merged with Ludlum Steel Co., Mr. Dohn was elected a director and vice-president in charge of sales. When Ludlum merged with Allegheny Steel Co. in 1938, he was named director and vice-president in charge of toolsteel sales.

Spectroscopy Society Meets

Future meetings of the Society for Applied Spectroscopy have been announced by Henry H. Hausner, chairman of the committee for public relations. The meetings will be held the first Tuesday of each month starting in October in the Lecture Hall, Old World Bldg., (Socony-Vacuum Training Center), 63 Park Row, New York City, at 8:00 p. m.

Van Zandt Williams will speak on "Developments in Infrared Absorption Spectrometry" at the first meeting on Oct. 5.

Chairman of the society is E. K. Jaycox of Bell Telephone Laboratories and secretary is R. R. Hampton, U. S. Rubber Co., Passaic, N. J.

Mail This Hotel Reservation Form Now!

For the 30th

NATIONAL METAL CONGRESS & EXPOSITION

PHILADELPHIA COMMERCIAL MUSEUM and CONVENTION HALLS

Metal Exposition Opens Monday, October 25 to Friday, October 29

(Certain Technical Sessions Will Be Held Saturday and Sunday, October 23 and 24.)

Extensive plans are being completed to provide interest during your visit to the 30th National Metal Congress and Exposition. You won't want to miss this outstanding technical program and metal show. In view of the large number planning to attend, we urge you to order double rather than single rooms and plan joint reservations so as to occupy all double rooms and twin-bedded rooms to capacity.

Cooperating Societies and Hotel Headquarters

American Society for Metals—Benjamin Franklin . . . American Welding Society—Bellevue-Stratford . . . Institute of Metals Division, American Institute of Mining and Metallurgical Engineers—Adelphia . . . Society for Non-Destructive Testing—Benjamin Franklin.

HOTEL RATES IN PHILADELPHIA

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BARCLAY	5.00 up	8.00 up	8.00 up
BELLEVUE-STRATFORD	4.00 up	7.00 up	8.00 up
BENJAMIN FRANKLIN	4.50 up	6.50 up	8.00 up
BRIERHURST	2.50 up	3.50 up	5.00 up
BROADWOOD	3.00 up	5.00 up	6.00 up
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ESSEX	3.50 up	5.50 up	7.00 up
HAMILTON COURT	3.00 up	6.00 up	6.00 up
LORRAINE	3.50 up	6.00 up	x8.00 up
MAJESTIC	2.50 up	5.00 up	x6.00 up
NORMANDIE	3.50 up	4.50 up	5.00 up
PARKER	3.50 up	4.50 up	5.50 up
PENN-SHERATON	4.00 up	6.00 up	6.50 up
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IMPORTANT: Assignment of rooms will be made by the Housing Bureau beginning **August 1st, 1948,** BUT NOT EARLIER. As soon as possible thereafter you will receive confirmation direct from the Housing Bureau. Duplicate will go to the hotel accepting reservations.

New Transfer Press Provides Economies In Use of Material

Reported by L. Wiley Cooper

Iowa State College

The general trend of substituting stampings for forgings and castings will be accelerated as dwindling high-grade ore supplies make more efficient use of our iron mandatory, according to A. C. Ortmann, of the Verson Allsteel Press Co. of Chicago, who spoke at a recent meeting of the Des Moines Chapter A. S. M.

The center of interest was brought to bear on the new series of transfer feed presses designed and built by the Verson company. Films were presented showing the features and the operations of several different models of this new type of press. According to Mr. Ortmann, the main advantage of the transfer feed press over its alternate, the progressive die press, is in the economy of material used.

In using the progressive die method, the part being formed or drawn must remain connected to the strip until the final operation has been completed. This often wastes much material, particularly when the center distance between the units of the progressive die is large. Additional saving of stock on the transfer feed type of press is possible because there is no necessity for the ribbon on both edges, which is a definite requirement with the progressive die method.

In the transfer feed method, the conventional long-bed press is used as the base unit. The press must be wide enough between the columns to contain the complete set of all dies required to perform the number of operations to produce the finished part. Suitable feeding devices (either magazine feeds or roll feeds) are provided according to the type of part to be made. The female portions of the dies are fastened to the ram or slide of the press, and the male portions are mounted on the bed of the press, with suitable die cushions.

The transfer feed mechanism consists of two horizontal bars or channels, to which are attached fingers for grasping the piece and moving it forward one station. The two bars are located one at the front and one at the back of the dies, and the fingers that grasp the piece are attached to these feed bars—one set of fingers at each die station. The bars and the fingers operate in a rectangular motion in a horizontal plane. The fingers move in toward the stamping, grasp it, and then move it to the next station where the fingers move out of the way of the descending ram, and are returned to the initial position in preparation for the next transfer cycle.

Mr. Ortmann stated that a very important feature entering into deep drawing by the transfer feed method is that the successive operations are performed fast enough and steadily enough to keep the stamping at suitable drawing temperature. This eliminates the necessity for very expensive and time-consuming annealing and pickling operations, often required when producing parts by single operations on a series of presses. Very often, the dies at the first stage are made very tight and with no more than stock clearance between the male and female dies. The purpose of this is to produce enough heat in the drawn shell at the first draw so that it remains hot enough through the succeeding operations.

Following the film, John Verson exhibited numerous representative types of stampings, showing successive operations and the finished part. Mr. Verson also answered numerous questions pertaining to the operation, features, and adaptability of this most modern type of press.

Selby Promoted by Timken

Joseph C. Selby, who reports the A.S.M. Canton-Massillon Chapter meetings for *Metals Review*, has recently been appointed assistant metallurgist of the Canton Bearing Factory of Timken Roller Bearing Co. He is a graduate of Ohio State University and, with the exception of a wartime interim with the Air Force, has been with Timken in the metallurgical division since 1941.

Birmingham Industrialist Dies

William H. Riddell, 53, president, Riddell Engineering Co., Birmingham, died Aug. 4 after a brief illness. Prior to moving to Birmingham nine years ago, Mr. Riddell was secretary and treasurer, Diamond Iron Works and Mahr Mfg. Co., Minneapolis.

IMPORTANT MEETINGS FOR OCTOBER

Oct. 5—Industrial and Commercial Gas Section, American Gas Association. Luncheon and meeting, Ritz Carlton Hotel, Atlantic City, N. J. (M. A. Combs, secretary, A.G.A., 420 Lexington Ave., New York 17.)

Oct. 6-9—Society of Automotive Engineers. Aeronautic and Aircraft Engineering Display, Biltmore Hotel, Los Angeles. (John A. C. Warner, secretary and general manager, S.A.E., 29 West 39th St., New York 18.)

Oct. 11-13—American Society of Tool Engineers. Semi-Annual Convention, Biltmore Hotel, Los Angeles. (Harry E. Conrad, executive secretary, A.S.T.E., 1666 Penobscot Bldg., Detroit 26.)

Oct. 11-13 — National Lubricating Grease Institute. 16th Annual Convention, Edgewater Beach Hotel, Chicago. (Carl E. Bolte, executive secretary, N.L.G.I., 4638 Mill Creek Parkway, Kansas City 2, Mo.)

Oct. 12-16—Chicago Section of American Chemical Society. Fifth National Chemical Exposition and National Industrial Chemical Conference, Coliseum, Chicago. (Marcus W. Hinson, manager, 1505 South Wabash Ave., Chicago 5.)

Oct. 13-15—Porcelain Enamel Institute. Tenth Annual Forum, University of Illinois, Urbana. (Industrial News Service, 526 Oliver Bldg., Pittsburgh 22.)

Oct. 13-16—Electrochemical Society. Fall Convention, Pennsylvania Hotel, New York. (R. M. Burns, secretary, 235 West 102nd St., New York 25.)

Oct. 13-14—Magnesium Association. Mid-Year Meeting, Skytop Club, Pa. (Magnesium Association, 30 Rockefeller Plaza, New York 20.)

Oct. 14-15—Gray Iron Founders' Society. 20th Annual Meeting and Convention, Haddon Hall, Atlantic City, N. J. (G.I.F.S., 33 Public Square, Cleveland.)

Oct. 20-21—National Conference on Industrial Hydraulics. Fourth Annual Meeting, Hotel Sheraton, Chicago. (S. F. Musselman, assistant chairman, applied mechanics research, Armour Research Foundation, Technology Center, Chicago 16.)

Oct. 21-22—Society of Automotive Engineers. Production Meeting and Clinic, Hotel Statler, Cleveland. (John A. C. Warner, secretary and general manager, Society of Automotive Engineers, 29 West 39th St., New York 18.)

Oct. 23-29—National Metal Congress and Exposition, Convention Hall, Philadelphia. See programs of cooperating societies in the first section of this issue of *Metals Review*. (W. H. Eisenman, director, 7301 Euclid Ave., Cleveland 3.)

Oct. 28-29—Porcelain Enamel Institute. 17th Annual Meeting and 1948 Sales and Management Conference, Stevens Hotel, Chicago. (Industrial News Service, 526 Oliver Bldg., Pittsburgh 22.)

MARK IT IN YOUR CALENDAR OF COMING EVENTS

30th NATIONAL METAL CONGRESS & EXPOSITION

Philadelphia—Oct. 25-29, 1948

Lindberg Opens New Heat Treating Plant

A new custom heat treating plant now under construction in St. Louis will be opened by Lindberg Steel Treating Co. on or about Nov. 1 according to an announcement by L. A. Lindberg, president of the company.

L. A. Lindberg

The new building will have 6000 sq. ft. of floor space and will house 14 new heat treating furnaces including three furnaces for toolroom tempering, two pit-type for production tempering and aluminum and nonferrous heat treating, one for production nitriding, two for toolroom hardening, one for high speed hardening, two for production hardening and three pot type for hardening in molten salts or lead.

New equipment for induction hardening and flame hardening is also being installed. Modern quenching equipment will include units for quenching in oil, brine, or molten salt. Protective atmosphere for hardening furnaces will be supplied by an endothermic-type atmosphere generator of 1500 cu. ft. per hr. capacity. A metallurgical control laboratory will be located in the office section of the building.

This is the second branch plant established by Lindberg in the last two years. The first was opened early in 1947 at Rochester, N. Y. The main plant is in Chicago.

Appointed Adjunct Professors

Stevens Institute of Technology, Hoboken, N. J., has recently appointed eight engineers from industry as adjunct professors in five fields of graduate study. Among them, as adjunct professors of metallurgy, are Peter Payson, assisant director of research, Crucible Steel Co. of America; Eugene P. Polushkin, consulting metallurgical engineer; and Norman E. Woldman, consulting metallurgical engineer.

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CHECK PREVIOUS NATIONAL METAL EXPOSITIONS, IF ANY, YOU HAVE ATTENDED:

CHICAGO, 1947 ☐ ATLANTIC CITY, 1946 ☐ CLEVELAND, 1945 ☐

MAIL THIS COUPON PRIOR TO OCT. 15

Amplex Enlarges Plant

A major expansion program of manufacturing facilities has recently been completed by the Amplex Division of the Chrysler Corp. The plant has been enlarged and new equipment installed. The major portion of the new equipment consists of heavy presses which are to be used to produce Oilite bearing and machine parts of greater size than normally made on a mass production basis.

Heart Ailment Takes Binns

H. Stanley Binns, a past chairman of the Cincinnati Chapter A. S. M. and metallurgist for Cincinnati Milling Machine Co., died of a heart ailment on July 21. Mr. Binns was a graduate in chemical engineering of University of Cincinnati. He began working for Cincinnati Milling Machine Co. in 1910 while still a student, thus being one of the first to take advantage of the now widely used cooperative program of work and study combined, initiated at University of Cincinnati.

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Baltimore	Oct. 18	Engineers' Club	Harry W. McQuaid	New Economics of Steelmaking and Processing
Birmingham	Oct. 4	Hopper's Cafe	R. F. Miller	High-Temperature Properties of Metals
Boston	Oct. 1	Hotel Sheraton	George A. Roberts	Heat Treatment and Properties of Toolsteels
Buffalo	Oct. 14	Hotel Statler	A. B. Kinzel	Metallurgy of Welding
Calumet	Sept. 21	Phil Smidt & Son	L. B. Rosseau	Heat Treating With Modern Salt Baths
Calumet	Oct. 12	Phil Smidt & Son	Howard C. Cross	High-Temperature Alloys
Chicago	Sept. 20	Furniture Club	J. B. Austin	Transformation of Austenite
Chicago	Oct. 11	Furniture Club		Help Wanted Night
Cleveland	Oct. 4	Cleveland Club	Walter Crafts	Selection of Heat Treating Alloy Steels
Cincinnati	Oct. 14	Engineering Society	D. Strauchen and A. L. Hartley	Machine Design
Columbus	Oct. 12	Fort Hayes Hotel	M. A. Grossmann	Toughness and Fracture of Hardened Steel
Detroit	Oct. 11	Rackham Memorial Bldg.	H. J. French	Sixth Annual Woodside Lecture
Eastern New York	Oct. 12	Circle Inn, Lathams	Lawrence Jacobsmeyer	Copper Brazing
Fort Wayne	Oct. 11		Wilbur Shaw	500-Mile Race
Georgia	Oct. 4	Atlantic Steel Co., Atlanta		Automotive Operations in the South
Golden Gate	Oct. 5		Tom Donovin	Silver Dollar Quiz
Hartford	Oct. 12	The Hedges	D. A. Nemser	The Effect of Structure on Machining of Steels
Inland Empire		Spokane Hotel	W. G. Theisinger	The Manufacture, Fabrication and Application of Clad Steels
Kansas City	Oct. 20	Edison Hall	G. DeCrose	Atomic Energy
Lehigh Valley	Sept. 24	Hellentown American Legion		Stag Party
Los Angeles	Sept. 23	Rodger Young Audit.	G. B. McMeans	Making Steel in California With Western Raw Materials
Los Angeles	Oct. 28	Rodger Young Audit.	F. M. Arnold	Cold Working Methods of Producing Metal Parts
Mahoning Valley	Oct. 12	V. F. W. Rooms, Youngstown, Ohio	Mr. Comstock	Nonferrous Subject
Montreal	Oct. 4	Queen's Hotel	A. S. Mitchell	Electroplating—Practical Aspects
Muncie	Sept. 21	Central High School		Information Please
New Jersey	Oct. 18	Essex House, Newark	R. E. Ward	Metallurgy in Design
Northwestern Pennsylvania	Sept. 23	Erie, Pa.	C. R. Austin	Metallurgical Properties and Engineering Applications of Iron Castings
North West	Oct. 21	Covered Wagon, Minneapolis	Robert S. Burns	Cold Working and Drawing
Northwestern Pennsylvania	Oct. 21	Titusville, Pa.	R. L. Templin	Determination and Significance of Mechanical Tests of Metals
Oregon	Sept. 28	Congress Hotel, Portland	W. G. Theisinger	Welding
Ottawa Valley	Oct. 5	Physical Metallurgy Research Lab., Bureau of Mines.	Donald F. Cornish	Practical Applications of Copper, Brass and Bronze
Philadelphia	Sept. 24	Temple University	Jack T. Wilson	22 Million Volt Betatron
Philadelphia	Oct. 22	Engineers' Club	Mr. Tracy, F. L. LaQue, M. G. Fontana	Corrosion
Pittsburgh	Oct. 14	Roosevelt Hotel	C. A. Zapffe	A New Concept for the Solid State
Puget Sound	Oct. 20	Engineers Club	L. T. Holt	Failures of Machine and Engine Parts
Rhode Island	Oct. 6	Engineering Society Bldg., Providence	E. E. Thum	Implications of Atomic Energy
Rocky Mountain	Oct. 15	Oxford Hotel, Denver	J. T. Wilson	Structure of Metals
Pueblo Group	Oct. 14	Minnequa Club, Pueblo	J. T. Wilson	Structure of Metals
Springfield	Oct. 11	Springfield, Vt.	A. P. Seasholtz	Salt Baths
St. Louis	Oct. 15	Hotel York	H. E. Scarbrough	Controlled Atmosphere Furnaces for Brazing and Heat Treating
Tri-City	Oct. 5	Rock Island Arsenal	C. H. Herty, Jr.	Steelmaking Practice as It Affects Properties of Interest to the User
Washington	Oct. 11	Garden House, Dodge Hotel	James B. Austin	Carbides and Nitrides in Steel
West Michigan	Sept. 20	Grand Rapids	R. L. Wilson	High-Temperature Metals for Jet Propulsion
West Michigan	Oct. 18	Grand Rapids	H. E. Boyer	Practical Heat Treatment
Worcester	Oct. 13	American Optical Co., Southbridge, Mass	L. F. Rowe	Generating and Polishing of Glass Lenses
York	Oct. 13	Waynesboro	N. J. Gebert	Sling Chains

ANNOUNCING THE

Third ASM Metallographic Exhibit

to be held at the National Metal Congress and Exposition in Philadelphia, Oct. 25 to 29, 1948. Rules are simple and few; there are no restrictions as to size or method of mounting. A large area in the exhibition hall has been reserved so the entries can be displayed to best advantage.

RULES FOR ENTRANTS

Work which has appeared in previous Metallographic Exhibits is unacceptable.

Photographic prints shall be mounted on stiff cardboard, each on a separate mount. Each shall carry a label giving
Name of metallographer
Classification of entry
Material, etchant, magnification
Any special information as desired

Transparencies or other items to be viewed by transmitted light must be mounted on light-tight boxes wired for plugging into an ordinary lighting circuit, and built so they can be fixed to the wall.

Exhibits must be delivered between Oct. 1 and Oct. 20, 1948, preferably by prepaid express or registered parcel post.

Address:
Metallographic Exhibit,
c/o W. H. Eisenman
National Metal Congress and Exposition
Commercial Museum
34th, below Spruce,
Philadelphia, Pa.

CLASSIFICATION OF MICROGRAPHS

1. Cast Irons and Cast Steels
2. Toolsteels (except carbides)
3. Irons and Alloy Steels (excluding stainless)
4. Stainless and Heat Resisting Steels and Alloys
5. Light Metals and Alloys
6. Heavy Nonferrous Metals and Alloys
7. Powder Metals (and carbides) and Compacts
8. Weld Structures (including brazed and similar joints)
9. Surface Phenomena (including corrosion products and electroplates)
10. Series of Micros showing Transitions or Changes During Processing
11. Macrographs of Metallurgical Objects or Operations (2 to 10 diam.)
12. Results by Non-Optical or other Unconventional Techniques.

AWARDS AND OTHER INFORMATION

A committee of judges will be appointed by the Metal Congress management which will award a first prize (a blue ribbon) to the best in each classification. Honorable Mentions will also be awarded other photographs which in the opinion of the judges closely approach the winner in excellence.

A Grand Prize, in the form of an engrossed certificate, and a money award of $50 will be awarded the exhibitor whose work is adjudged "best in the show", and his exhibit shall become the property of the American Society for Metals for preservation and display in the Sauveur Room at the Society's Headquarters.

The Society reserves the right to retain all prize-winning micrographs for six months for a traveling exhibit to Chapters. All other exhibits will be returned to owners by prepaid express or registered parcel post during the week of Nov. 1, 1948. Entrants living outside the U. S. A. will do well to send micros by first-class letter mail endorsed "May be opened for Customs inspection before delivery to addressee".

30th NATIONAL METAL CONGRESS

COMMERCIAL MUSEUM, PHILADELPHIA

October 25 to 29, 1948

1

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